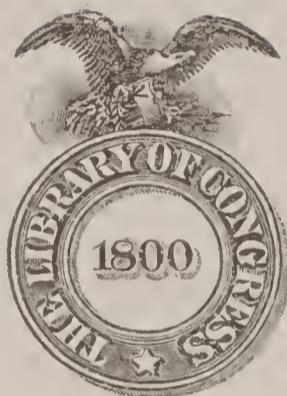


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{ 1911

RAILWAY FREIGHT RATES, INLAND WATERWAYS, AND CANALS OF GERMANY

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REPORT BY
A. M. THACKARA
AMERICAN CONSUL GENERAL AT BERLIN

SUPPLEMENTED BY REPORTS FROM OTHER CONSULAR
OFFICERS IN GERMANY



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RAILWAY FREIGHT RATES, INLAND WATERWAYS, AND CANALS OF GERMANY.

By A. M. THACKARA, *American Consul General at Berlin.*

This report is in answer to questions prepared by the National Waterways Commission and the Department of Commerce and Labor and transmitted to American consuls through the Department of State.

CHAPTER I.

QUESTIONS RELATING TO FOREIGN RAILWAY RATES SUBMITTED BY THE NATIONAL WATERWAYS COMMISSION THROUGH THE DEPARTMENT OF STATE.

I. Give ten examples of rates on coal on different railway lines for different distances, with the following details:

- (a) Give termini for each shipment.
- (b) Give distances of each shipment, including in the list of ten rates at least three rates for the maximum distance that coal is shipped.
- (c) Give separately the terminal and transportation charge. (If this is not possible, make note of the fact that the two are combined.)
- (d) State what service is covered by the terminal charge.
- (e) State the class of rate into which the coal traffic falls; that is, whether the rate is a special or commodity rate or a normal class rate, and, if the latter, what class.
- (f) Give all other facts concerning method of shipment which affect the rate, such, for example, as minimum carload weight or minimum train load, open or closed cars, fast or slow freight, and the like.
- (g) If any of these rates have been given to encourage the development of any industry, state the facts.

II. Answer the above seven questions (a to g), quoting in each case ten examples of rates on different railway lines for different distances for the following commodities: 1, iron ore; 2, stone; 3, lumber; 4, fertilizer; 5, grain.

III. Give ten illustrations of special rates granted to export business on different railways for different distances, and answer in each case the questions propounded above for the coal traffic (a to g) so far as they are applicable to the export business. Make a statistical tabulation comparing these export rates with local rates between the same termini.

IV. Give ten illustrations of rates charged by different railways for different distances on the highest grade of classified freight, that which, in many countries, corresponds to the express business of the United States, and answer in each case the questions propounded for the coal traffic (a to g).

V. Give ten illustrations of rates charged by different railways for different distances on typical products included in the various categories of the regular freight classification, showing both carload and less than carload rates, and answer in each case the questions propounded for the coal traffic (a to g).

VI. Are the freight rates based absolutely on distance, or is the rate per ton-mile less for longer distances? Show, in the case of different commodities, at what distances the fall in the rate per ton-mile takes place.

CHAPTER II.

QUESTIONS SUBMITTED BY THE DEPARTMENT OF COMMERCE AND LABOR THROUGH THE DEPARTMENT OF STATE RELATIVE TO RIVERS AND CANALS IN FOREIGN COUNTRIES.

I.—PUBLIC SUPERVISION.

(a) State what public authority, national, state, or local, exercises supervision in the different instances over navigable streams and canals.

(b) What are the powers and duties of such officials in regard to the following:

- (1) Capitalization of navigation corporations.
Regulation of freight rates.
Reports of operation.
Maintenance and improvement of channels, docks, and terminal facilities.
- (2) Collection of statistics of water-borne traffic, and by what agencies such statistics are compiled and published.

II.—WATERWAY IMPROVEMENTS.

(a) Is there any established policy as to water powers developed by works constructed for improving navigation? Give illustrations.

(b) To what general extent have river improvements and the construction of canals been carried on by the Central Government, by local governments, and by private enterprise? Give typical and important illustrations of each. Describe any system of cooperation and contribution between the Central Government and local government in such works.

III.—FLOATING EQUIPMENT.

(a) What is the general character of vessels used on rivers and canals?

- (1) The relative use of self-propelled vessels and towed vessels.
- (2) Motive power for barges and canal boats.
- (3) Size and draft of vessels.
- (4) The use of iron, steel, and wood in vessel construction.
- (5) The cost of various types of boats.
- (6) The use of special types of boats for particular cargoes and on different classes of waterways.
- (7) The size of fleets of barges.
- (8) Is the type of boats adapted to low-water stages, or are they constructed with a view to utilization in high water?

In each case specific information is desired showing the situation in typical instances rather than general statements of a summary character.

IV.—OWNERSHIP OF VESSELS AND BUSINESS ORGANIZATION.

(a) Do canal companies or other waterway improvement companies own and operate vessels? Give examples.

(b) Are there important cases of consolidation of vessel owners into large corporations operating extensive fleets on inland waterways?

(c) To what extent are vessels owned and operated by railroads, or by producing and distributing concerns, such as coal, oil, lumber, ore, etc., fleets? Give examples.

(d) Are there any fleets of merchant vessels owned and operated by public authorities? Give examples.

(e) Are there important instances of combinations or monopolies controlling towing on canals and rivers? Give examples.

V.—TERMINAL FACILITIES.

(a) What are the important or striking physical features of river and canal terminals, such as docks, wharves, piers, and floating wharf boats? Give illustrations and send photographs with this answer.

(b) Describe the most advanced methods of loading and unloading vessels on inland waterways, including the use of mechanical appliances.

(c) Are railroad tracks located on terminals of inland waterways, permitting direct transfer between railroad and water lines? Do such railroad tracks form a belt railroad, connecting all the railroads at a given port? Give examples.

(d) Are river and canal terminals owned by public or private interests? Are they owned at all by private railways? If so, give the important instances.

VI.—TOLLS AND FREIGHT RATES.

(a) Are tolls charged on canals and rivers? If so, what elements are considered in framing them and what service do they cover? Are there separate tolls for boats and cargo? Give typical illustrations.

(b) What elements enter into the making of towing rates on canals and rivers? Give illustrations of towing charges and send copies of any tariffs or towing rates.

(c) Do inland water lines have regular schedules of freight rates and classifications of freight? Are the rates stable or do they vary frequently with traffic exigencies? Give illustrations.

(d) How are inland waterway rates affected by—

- (1) Distance of haul?
- (2) Quantity of commodity offered?
- (3) Speed?
- (4) Character of commodity?

Give illustrations on important waterways.

(e) Do prorating arrangements exist between water lines and railroads, and to what extent? Give illustrations and send copies of joint rail and water tariffs.

(f) How do inland water rates affect railroad freight rates? Are railroad freight rates to water competitive points higher than to interior nonwater points of similar distances? Give illustrations.

Compare inland water rates with paralleling railway rates for short and for long distances, giving specific illustrations which shall show whether waterways have greater competitive power in the one case than in the other.

(g) What is the general attitude of rail and water lines toward each other? Is there active competition or are there agreements for the division of traffic? Give examples.

(h) Is there any legislation regulating the relations between rail and inland waterway systems of transportation? Is there any governmental restriction on the lowering of rail rates in competition with water rates? Give examples.

(j) Is it customary for shippers of goods by inland waterways to insure them, or is the risk assumed by the carrier? To what extent does this affect the freight rate? Give examples.

VII.—WATER-BORNE TRAFFIC.

(a) What is the general character of traffic on inland waterways: The principal commodities moved, the proportion and character of traffic moved in different directions, relative importance of package and bulk freight, etc. (This should be answered specifically for different waterways.)

(b) Send official publications giving, for the last ten years, available statistics of vessel movement and traffic carried on inland waterways; also railroad traffic, tonnage, and ton-mileage.

(c) Taking important inland water routes, does local traffic or other traffic predominate, and in what general proportion?

(d) Give a concise statement of typical conditions of labor which is employed in navigation and in terminal handling, particularly with reference to wages paid.

NOTE.—The above questions were revised by the members of the National Waterways Commission.

CHAPTER I.

RAILWAY FREIGHT RATES OF GERMANY.

Since the foundation of the German Empire the policy of the Imperial and state governments has been to secure the unification of the tariff rates and uniformity in the administrative regulations of the railroads of Germany, on the principle that the highest interests of the nation would thereby to a greater extent be protected.

The steady movement toward uniform freight rates throughout this country has been facilitated by the fact that less than 9 per cent of the entire railway mileage of the Empire is under private control.

In Prussia the mileage of the state-owned railways in 1907 was 31,846 kilometers (19,788 miles), as compared with 2,165 kilometers (1,345 miles) in the possession of private corporations.

In certain parts of Germany the private lines are fairly numerous, but each of limited mileage. They do not as a rule form any part of the through communication, but are in general contributory lines or serve the local traffic of a small district.

In Saxony the railways are wholly state except a few miles (6 miles) of private lines connecting with mines.

In Bavaria now that the state ownership of the Palatinate Railway was secured on January 1, 1909, private lines form but a small part of the internal means of communication and their ultimate absorption by the state is only a question of time. There are 7,267 kilometers (4,515 miles) of railways belonging to the states, as compared with 267 kilometers (166 miles) of private roads.

In Württemberg there are 1,708 kilometers (1,061 miles) of state-owned railways and 143 kilometers (89 miles) of private lines.

In Baden there are 1,781 kilometers (1,107 miles) of state and 227 kilometers (141 miles) of private railways.

In Alsace-Lorraine there are 1,732 kilometers (1,076 miles) of state and 16 kilometers (10 miles) of private railways.

In the whole of Germany there are 53,016 kilometers (32,943 miles) of state-owned railways and 3,510 kilometers (2,181 miles) of private-owned.

The above information refers to railways having the normal gauge—1,435 meters (4,693 feet)—and does not include the narrow-gauge railways.

The full-gauge railways of Germany are divided into two classes—the trunk lines (*Hauptbahnen*) and the feeders, connecting railways, local railways, etc. (*Nebenbahnen*). The latter may form a part of a through-rate route, or in other words taking the generally accepted system for the compilation of rates, i. e., by the shortest mileage,

when there is a route with a "Nebenbahn" as intermediary, that route is usually taken into account for the transportation charges. It may also happen that the development of the traffic eventually results in a "Nebenbahn" being classed as a trunk line, in which case the regulations applying to the latter must be observed.

In addition to the above full-gauge railways there are the full and narrow gauge lines not used by the general public, such as mining, industrial, agricultural, and forest lines. Under these are included lines connecting with private establishments, providing the terminus is not noted in the tariff and does not serve for public use.

There are also lines which possess a purely local character, such as street railways for the carriage of passengers and interurban branch roads resembling street railways in character, construction, and management, but designed for the carriage of freight between neighboring localities.

For the purposes of this report the railway rates considered are only those of the state-owned railways, as the rates in force on the private railways, while varying more or less from the regular rates, are to a great extent calculated on the same general principles.

The administration of the railways and the supervision of the private lines are left to each Federal State.

The state railways, however, in Germany are practically all under the same method of control, with variations in the title of the officials or office at the head. The official head of the Prussian state railways is the minister of public works. In him is vested large powers of administration, and he has wide authority in supervising the expenditures of the amounts appropriated by the Parliament. In addition there are also various supervisory authorities.

The upper house of Parliament (Bundesrath) is the authority responsible for the regulations in connection with the transport of passenger and freight traffic and the regulations dealing with the construction and working of the railways. The executive office of the Bundesrath is the imperial railway department (Reichs-Eisenbahn Amt), which consists of a president and a requisite number of members, the seat being in Berlin. Its duties are to exercise supervision over railway matters; to see that the provisions of the constitution of the German Empire as well as all other laws and constitutional enactments pertaining to railways are enforced, and, after obtaining information from the various railway administrations, or by personal inquiry, to take the necessary measures to remedy any defects or abuses occurring in the railway systems. This office also prepares questions for the consideration of the Bundesrath in so far as they relate to railway matters.

For the elaboration of the traffic regulations in detail form for the guidance of officers and employees there is the German Railroad Traffic Association (Deutscher Eisenbahn Verkehrs Verband). Although the activity of this association is chiefly confined to internal railway matters, it also deals with the regulations for the dispatch of freight and the regulations for the conveyance of articles. There are 79 ordinary and 15 extraordinary members of the association, the membership consisting of the various railway managements in Prussia and of private and other state railways in Germany.

For the regulations regarding the tariffs of freight rates there is the "General Conference," composed of all of the railways of the German Empire, convened by the Prussian minister of public works, meetings being held as a rule once a year. The following come within the province of the conference: The general supplementary traffic regulations, the general tariff regulations, freight classification, and subsidiary charges.

The number of votes to which each railway represented in the conference is entitled is as follows: Up to 50 kilometers (31 miles), 1 vote; above 50 and up to 150 kilometers (93.2 miles), 2 votes; above 150 and up to 300 kilometers (186.4 miles), 3 votes; above 300 and up to 500 kilometers (310.7 miles), 4 votes; and for every additional 200 kilometers (124.3 miles), 1 vote more.

The decisions of the conference are binding if they are passed unanimously, otherwise they become effective if within the space of four weeks they have not been negatived by such a number of railway managements as represent at least one-fifth of the entire voting power of the conference. The approved decisions must be carried out by all the railways belonging to the conference on an appointed date, usually on the 1st day of April following the meeting of the general conference.

For the preparation of the business of the general conference there exists a permanent tariff commission, which on April 1, 1908, consisted of representatives from 14 of the leading railway boards. Forming a part of the permanent commission is a traders' committee, representing the interests largely dependent upon railway transportation. Its membership consists of five representatives of agriculture elected by the combined chambers of agriculture, five representatives of manufacturing interests, five representatives of commerce elected by the combined chambers of commerce and industry, and one member appointed by the Bavarian Government.

The following are the matters which may be referred to the tariff commission by any railway affiliated with the general conference or by the traders' committee: The general supplementary traffic regulations, the general tariff regulations, and freight classification.

The discussions take place in meetings of both the tariff commission and the traders' committee. Matters belonging to passengers and baggage are dealt with by the tariff commission alone. Meetings are held in February, June, and September. Reports of the meetings containing the decisions arrived at, excepting those relating to passengers and baggage, are submitted to the railways forming the general conference and to each member of the traders' committee and his deputy. A quorum consists of at least 10 of the representatives of the railways and 7 of the traders. Resolutions are passed by the majority of the votes.

There is also the Association of German Railway Administrations (Verein Deutscher Eisenbahn Verwaltungen), which comprises the majority of railways in Germany, Holland, Luxemburg, and Roumania. The administration of the Austrian-Hungarian, of two of the larger Russian railroads, and of one small Belgian railroad are also members of this association. Its authority deals principally with the working regulations for the interchange of traffic between

the various railways concerned; that is, regulations as to the conveyance of passengers and freight and the mutual obligations and duties of railways and the persons making use of the same, car demurrage, etc.

For the general consideration of questions regarding the railway tariffs, with the exception of the classification of freight, advisory councils, called district advisory councils, assist the different railway managements. There is also a general advisory council for the assistance of the minister of public works.

In Prussia all the members of the district advisory councils and three-quarters of the members of the general council are chosen voluntarily, the remainder being nominated by the minister. The members of the councils are also chosen independently in Oldenburg, Württemberg, and Hesse. In Baden and Saxony, in addition to the members elected voluntarily, the minister also appoints a certain minority. In Bavaria all the members are appointed by the crown on the recommendation of the various economic bodies.

In Prussia the councils differ from those of other States in certain important points, in that they are created by act of Parliament, whereas elsewhere they are appointed by the Crown or the chief minister, and in Prussia there are two distinct bodies, the councils for the district managements and the general council to assist the minister, whereas in other States there is only a single council for the central administration.

In Prussia the district councils are composed of representatives of commerce, industry, agriculture and forestry. The members, as also their deputies in case of members being prevented from attending, shall be elected for three years by the chambers of commerce, merchants' associations, agricultural provincial unions, and other associations and unions of commerce and trade, and of agriculture and forestry to be designated by the ministers of public works. The number of members and deputies, as also their proportionate distribution among the various interested bodies, shall be decided by the above-mentioned ministers.

The general advisory council shall consist of a president and his deputy, nominated by the King for three years; three members and deputies appointed by the minister of agriculture and forestry; three members appointed by the minister of commerce and trade; two members appointed by the minister of finance; two members appointed by the minister of public works; one member for the government districts of Cassel and Wiesbaden; one member for each of the cities of Berlin and Frankfort on the Main; two members for each of the provinces of East Prussia, West Prussia, Pommerania, Brandenburg, Schleswig-Holstein, Hanover; three members for each of the provinces of Silesia, Saxony, Westphalia, and the Rhineland, and a like number of deputies.

As regards non-Prussian States of the Empire whose territory is crossed or surrounded by the Prussian-Hessian state railways to any great extent, representatives of commerce, industry, agriculture, and forestry may be admitted if their respective associations express a desire to this effect and the sanction of their respective governments is obtained. They are elected by the district advisory councils for a period of three years. Special experts may be called in to give in-

formation on certain matters at the discretion of the minister of public works.

The councils are only advisory in the true sense of the word, having no authority whatever over the railway administrations, although the latter prepare all the data necessary for the discussion of the questions brought before the district councils. The secretary of the council is a railway official and the chairman is the president of the state railway management concerned, but he and any other railway officials attending the meetings as experts have no vote.

The matters brought before the general advisory council are of the same general character as those handled by the district councils, but of greater national importance.

The councils, after investigation and discussion of the various questions, can only submit their recommendations to the proper officials.

TARIFF RATES.

Railroad freight rates in Germany are based on a scheme of kilometric rates for different classifications of goods and for fast and slow services, varying it may be in different States slightly in amount, but not in principle.

In the following table is indicated the basis on which the rates for the general freight traffic of the Prussian railway systems are calculated. The freight is divided into nine general classes. For each class there is a distinct rate per ton per kilometer (0.621 mile), diminishing in some classes with the increase of the distance. For each class there is a distinct rate for terminal charges, for distances exceeding 100 kilometers (62.1 miles), materially lessened for distances under 100 kilometers. With slight unimportant changes the same basis is used by the other States.

Normal tariff rates.

Distance.	Not in carloads.					
	Fast freight.		General freight.		Special tariff for certain specified goods.	
	Rate per (metric) ton-kilometer.	Rate per (short) ton-mile.	Rate per (metric) ton-kilometer.	Rate per (short) ton-mile.	Rate per (metric) ton-kilometer.	Rate per (short) ton-mile.
Less than 50 kilometers (31 miles).....	22	7.6	11	3.8	.....	.....
51-200 kilometers (124 miles).....	20	6.9	10	3.5	.....	.....
201-300 kilometers (186 miles).....	18	6.2	9	3.1	.....	.....
301-400 kilometers (249 miles).....	16	5.5	8	2.8	.....	.....
401-500 kilometers (311 miles).....	14	4.8	7	2.4	.....	.....
Over 500 kilometers (311 miles).....	12	4.2	6	2.1	.....	.....
For all distances.....	.....	.....	.....	.....	18	12.8
Terminal charges for each $\frac{1}{10}$ metric ton or fraction of same, in pfennigs:						
1-10 kilometers (6.2 miles).....	20	.....	10	.....	.....	.....
11-20 kilometers (12.4 miles).....	22	.....	11	.....	.....	.....
21-30 kilometers (18.6 miles).....	24	.....	12	.....	.....	.....
31-40 kilometers (24.9 miles).....	26	.....	13	.....	.....	.....
41-50 kilometers (31.1 miles).....	28	.....	14	.....	.....	.....
51-60 kilometers (37 miles).....	30	.....	15	.....	.....	.....
61-70 kilometers (43 miles).....	32	.....	16	.....	.....	.....
71-80 kilometers (49 miles).....	34	.....	17	.....	.....	.....
81-90 kilometers (56 miles).....	36	.....	18	.....	.....	.....
91-100 kilometers (62 miles).....	38	.....	19	.....	.....	.....
Over 100 kilometers.....	40	.....	20	.....	.....	.....

¹ The rate for general freight is applicable for distances greater than 726 kilometers (456 miles).

Normal tariff rates—Continued.

Distance.	Carloads.								Special tariffs.			
	A1.		B.		A2.		I.		II.		III.	
	Pfgs.	Cts. ¹	Pfgs.	Cts. ¹	Pfgs.	Cts. ¹	Pfgs.	Cts. ¹	Pfgs.	Cts. ¹	Pfgs.	Cts. ¹
For all distances.....	6.7	2.3	6	2.1	5	1.7	4.5	1.6	3.5	1.2	.....	.....
1-100 kilometers (62.1 miles).....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2.6	0.9
Over 100 kilometers.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2.2	.76
Terminal charges for each $\frac{1}{10}$ metric ton or fraction of same, in pfennigs:												
1-10 kilometers (6.2 miles).....	8											
11-20 kilometers (12.4 miles).....	9											
21-30 kilometers (18.6 miles).....	10				6		6		6		6	
31-40 kilometers (24.9 miles).....	11											
41-50 kilometers (31.1 miles).....	12											
51-60 kilometers (37 miles).....	12											
61-70 kilometers (43 miles).....	12											
71-80 kilometers (49 miles).....	12				9		9		9		9	
81-90 kilometers (56 miles).....	12											
91-100 kilometers (62 miles).....	12											
Over 100 kilometers.....	12				12		12		12		12	

¹ Rate per short ton-mile.

The application of the above table is readily seen from a few examples. It is required to establish the rate for 100 kilograms of general freight from Berlin to Chemnitz, a distance of 220 kilometers (136.4 miles).

For the first 50 kilometers the rate in the table is 11 pfennigs per ton-kilometer. For the next 150 kilometers it is 10 pfennigs. For the remaining 20 kilometers it is 9 pfennigs.

The calculation is as follows: One hundred kilograms equals one-tenth of a ton, and the rates in column "General freight" are hence to be divided by ten.

	Marks.
Transport, 50 by 1.1.....	0.55
Transport, 150 by 1.....	1.50
Transport, 20 by 0.9.....	.18
Terminal charge, 100 kilometers.....	.20
 Total.....	2.43

Again, the rate is required for 15 tons of freight falling under the Class III of Special Tariffs, from Berlin to Chemnitz. The rate is 2.2 pfennigs per ton-kilometer, or—

	Marks.
Transport, 2.2 by 220 by 15.....	72.60
Terminal charges, 15 by 10 by 12.....	18.00
 Total.....	90.60

In order to save calculations such as the above, a table has been compiled called the "Allgemeine Kilometer Tariftabelle," giving the total freight rate, including transport and terminal charges, for each class of freight for all distances from 1 to 1,600 kilometers.

The following abridgment of the table in question affords a fair view of its essential features. The various rates are given for each even hundred kilometers, and also for each 10 kilometers of the first 100 kilometers. The rates are in marks per metrical ton for the kilometer distances. In the final column the rates for general freight not in full carloads are also given in terms of dollars per short ton of 2,000 pounds per mile for the purpose of affording an easy comparison with current American freight rates.

It might be noted that any rate in the following table can be transformed into dollars per short ton-mile if the amount be divided by the distance in kilometers and multiplied by the factor 0.347.

General tariff for freight transported throughout Germany.

[Rates per metric ton of 2,204.62 pounds for the following distances, inclusive of terminal charges.]

Kilo- meters. ¹	Fast freight.	General freight.	Special tariff for certain specified goods.	Special tariffs.						Freight per ton- mile (short tons).
				A1.	B.	A2.	I.	II.	III.	
10.....	4.2	2.1	1.8	1.7	1.4	1.1	1.1	1.0	0.9	\$0.0729
20.....	6.6	3.3	2.7	2.4	2.1	1.6	1.5	1.3	1.1	.0572
30.....	9.0	4.5	3.6	3.2	2.8	2.1	2.0	1.7	1.4	.0520
40.....	11.4	5.7	4.5	4.0	3.5	2.6	2.4	2.0	1.6	.0485
50.....	13.8	6.9	5.4	4.8	4.2	3.1	2.9	2.4	1.9	.0478
60.....	16.0	8.0	6.3	5.5	4.8	3.9	3.6	3.0	2.5	.0461
70.....	18.2	9.1	7.2	6.3	5.4	4.4	4.1	3.4	2.7	.0451
80.....	20.4	10.2	8.1	7.1	6.0	4.9	4.5	3.7	3.0	.0441
90.....	22.6	11.3	9.0	7.8	6.6	5.4	5.0	4.1	3.2	.0434
100.....	24.8	12.4	9.9	8.6	7.2	5.9	5.4	4.4	3.4	.0428
200.....	45.0	22.5	18.0	15.4	13.2	11.2	10.2	8.2	5.6	.0390
300.....	63.0	31.5	26.0	22.1	19.2	16.2	14.7	11.7	7.8	.0364
400.....	79.0	39.5	34.0	28.8	25.2	21.2	19.2	15.2	10.0	.0342
500.....	93.0	40.5	42.0	35.5	31.2	26.2	23.7	18.7	12.2	.0318
600.....	105.0	52.5	50.0	42.2	37.2	31.2	28.2	22.2	14.4	.0304
700.....	117.0	58.5	58.0	48.9	43.2	36.2	32.7	25.7	16.6	.0290
800.....	129.0	64.5	64.5	55.6	49.2	41.2	37.2	29.2	18.8	.0280
900.....	141.0	70.5	70.5	62.3	55.2	46.2	41.7	32.7	21.0	.0272
1,000.....	153.0	76.5	76.5	69.0	61.2	51.2	46.2	36.2	23.2	.0265
1,100.....	165.0	82.5	82.5	75.7	67.2	56.2	50.7	39.7	25.4	.0260
1,200.....	177.0	88.5	88.5	82.4	73.2	61.2	55.2	43.2	27.6	.0256
1,300.....	189.0	94.5	94.5	89.1	79.2	66.2	59.7	46.7	29.8	.0252
1,400.....	201.0	100.5	100.5	95.8	85.2	71.2	64.2	50.2	32.0	.0249
1,500.....	213.0	106.5	106.5	102.5	91.2	76.2	68.7	53.7	34.2	.0246
1,600.....	225.0	112.5	112.5	109.2	97.2	81.2	73.2	57.2	36.4	.0244

¹ 1 kilometer = 0.621 mile.

In the above table there are two general categories depending upon whether or not goods are despatched in complete carloads. The freight is classed under nine different heads:

I. SHIPMENTS NOT MADE IN CARLOADS.

1. *Fast freight.*—This class includes articles sent at the discretion of the railway authorities either by regular, passenger, or by fast-freight trains. The rates are double those charged for ordinary freight. When freight is sent in complete carloads it pays double the rate prescribed for complete carloads of the classes A1 and B.

Special fast freight pays double the regular rates of fast freight in less than carload lots and the quadruple of the rates classed A1 and B for carloads. It is forwarded by the first train available and has preference over all other freight.

2. *General freight.*—In this class falls the great bulk of the freight not delivered in carloads by the consignor. Very light and voluminous goods, such as furniture, baskets, feathers, barrels, trees and shrubs, unbaled hay, hops, straw, wool and bark are charged 50 per cent above the regular rate.

In most German cities much of the merchandise which would be naturally included in this class is now actually despatched under the lower tariff for carloads. A shipper sending a few packages to

any important city, unless the case is urgent, delivers them to a general forwarding agent, who collects from various firms enough freight destined to the point in question, so that he can despatch an entire carload at frequent intervals, and his customers can profit by the lower rate.

There exist also lists of specified articles which are forwarded by fast freight at slow-freight rates, whether the goods are consigned in carload lots or in less quantities. These are for the most part perishable wares, such as bees, certain kind of vegetables, butter, fish of various descriptions, shellfish, milk and cream, fresh berries, grapes, etc.

3. *Special freight*.—Articles in this class are carried at a reduced rate, as is shown in the table. It includes goods of low value, such as bicycles, motor cycles, fertilizers, forage and other food for animals, grain of all descriptions, clover, machinery and agricultural implements, metals and metal wares, scrap metal, oil cake, mineral salts, drainpipes, peat, etc. The low rate of the tariff for this class becomes equal to that for ordinary freight for distances greater than 726 kilometers (456 miles).

If any of the specified articles enumerated above are entered with other articles on a fast-freight waybill, the whole consignment will be charged at the fast-freight rate unless, the weights being entered separately, it is found that it would be cheaper to charge freight separately.

In the case of consignments of fast freight in less than carload lots such separate calculation will only be made if the goods of the special tariff for specified goods and the other goods are delivered in separate packing.

II. SHIPMENTS IN COMPLETE CARLOADS.

When goods are shipped with a minimum weight of 5 or 10 metric tons per car the following tariff rates for complete carloads become operative:

4. (A1) General freight in carloads of from 5 to 10 tons.

5. (B) General freight in carloads of 10 tons or more. These two classes include all freight not provided for in special tariffs.

6. (A2) The rates of this tariff apply to freight listed in Special Tariffs I and II, but shipped in quantities of less than 10 metric tons and over 5 tons. The rate for 5-ton consignments of such goods as are included in Special Tariff III is the 10-ton rate for Special Tariff II.

7. *Special Tariff I*.—This comprises raw cotton, iron and steel wares of all descriptions, asbestos, lead, raw skins and hides, glass, chalk, dyewoods, grain, certain kinds of wood, wood wares, seeds, malt, flour, paper, waste woolen products, and some other similar articles shipped in carloads of at least 10 tons.

8. *Special Tariff II*.—In this class are found asphalt, flax, hemp, wood, hops, cut stone, bone black, earthenware, sawdust, paper (for export) and the like, wood from middle Europe, structural iron and iron pipe, minimum weight 10 tons. This tariff also includes all goods listed under Special Tariff III shipped in quantities of from 5 to 10 tons.

9. *Special Tariff III.*—This applies to waste cotton products for the manufacture of paper, etc., waste woolen products for the manufacture of pasteboard wares, waste coal-tar products, waste tin products, waste products containing iron oxide and other metallic oxides, such as aniline oil, etc., trees and shrubs, bark, pig iron, ores, earths, potatoes, railway ties, bones, rags, heavy oils, oil cake, wood and coal, hay, hats, timber from middle Europe, minimum weight 10 tons.

As a rule German freight cars have a carrying capacity of 10, $12\frac{1}{2}$, and 15 tons. There are also specially constructed cars which are used for special kinds of freight, among which are the ore cars, which have a capacity of 40 tons.

Ordinary freight cars have a floor space of from 15 to 18 square meters (161.4 to 193.7 square feet); there are also those having a floor space of from 21 to 25 square meters (226 to 269 square feet), which can be obtained upon special request.

The calculation of freight for carloads is based on a minimum weight of 10 tons and 5 tons, as the case may be, for each car used even though the actual weight be less than 10 tons and 5 tons respectively. For shipments of less than 10 tons but more than 5 tons, freight will be calculated on the actual weight at the five-ton rate or on 10 tons at the rate for that class for each car used, whichever calculation works out the cheaper.

If for one waybilled shipment, piece goods and carload rates are calculated separately, the piece-goods rates must be calculated on a minimum weight of 10 kilograms (22 pounds). In other respects the regulation relating to carloads are applicable. The railway administration has the right to utilize any space in the car if such space has not been used to full advantage by the shipper, or if the loading weight has not been exceeded.

Casks, vats, barrels, metal casks, metal cylinders (for the conveyance of spirits, chemicals, oil, varnishes), tin boxes, metal cake boxes, bottles, jugs, boxes, straws, etc., for packing, sacks, etc., when shipped as piece goods, freight on half the actual weight will be calculated in accordance with the bases of the general piece-goods class with a minimum as for 20 kilos (44 pounds), unless in the case of empties used when filled for the transportation of articles coming under the category of the special tariffs for specified piece goods, freight calculated on the full weight in accordance with the bases for this tariff is cheaper.

EXCEPTIONAL TARIFFS.

The above classes do not include all current rates. There are other exceptional tariffs (Ausnahme tarife) which vary considerably both as regards the kilometric rate and the terminal charges. These rates are especially low to further important economic interests affecting sometimes the Empire at large, but more frequently individual States and sections.

The objects, as publicly announced, in forming such exceptional tariffs, were:

1. The advancement of the internal industrial and agricultural production by cheapening the cost of raw materials or needed equipments.
2. To facilitate the export of German wares.

3. To support the trade of German commercial centers, and more especially the seaports, against foreign competition.

4. To favor German railway lines against the competition of foreign railroads and also of foreign waterways.

The exceptional tariffs are in the main based on political or national considerations, and in practice are only granted when by so doing there is no danger of injury being caused to internal economic interests or when this concession would appear to be rendered necessary by such important considerations as those above mentioned.

At the present time there are 27 classes of exceptional tariffs in force, most of which have subdivisions. There are also 31 classes of seaport exceptional tariffs to encourage the export trade.

For example, exceptional rates have been granted by the Prussian State railways for the conveyance of grain traffic from Russia to over-sea countries (Sweden, Norway, England, etc.) and the rate per ton-kilometer from the frontier to the German harbors Königsberg, Danzig, etc., is lower than the rate for German grain between the same points. The rate per ton-kilometer from the frontier to Königsberg is 2.5 pfennigs (0.595 cent) including half the terminal charge as against 4 pfennigs (0.952 cent) for local grain between the same points. A special tariff is granted for the grain traffic from Hungary to England; for grain intended for export via Hamburg a special rate is given from the frontier to Hamburg, which is less by 115 marks (\$27.37) for carloads of 10 tons than the local rate between the same points, 353 marks (\$84.01) as against 468 marks (\$111.38). These reduced rates have been instituted owing to the competition of the Belgian, Dutch, and French harbors and the Rhine shipping trade and by the Adriatic harbors and the Elbe shipping trade as regards Austria.

For minerals, petroleum, naphtha from the North Sea harbors and Lübeck, Stettin, and Swinemünde to South West Germany, Bavaria, Switzerland, Austria-Hungary, and vice versa direct preferential rates have been introduced by which the rate per ton-kilometer for the Prussian State Railway section, varies for carloads of Class B from 4 pfennigs (0.95 cent) to 2.2 pfennigs (0.52 cent) as against 6 pfennigs (1.428 cents) for the local traffic between the same points.

From Sosnowice in Russian Poland to Bavaria, Saxony, and Prussian stations there is a reduced rate for lubricating oil varying from 5.28 pfennigs (1.257 cents) to 1.88 pfennigs (0.45 cent) per ton-kilometer against an ordinary rate of 6 pfennigs (1.428 cents) per ton-kilometer, with terminal charges in both cases of 60 pfennigs (14.28 cents) in competition with the rates of other than German railways.¹

There are numerous other exceptional tariffs, probably the most comprehensive being that for raw materials (exceptional tariff 2) with 10 subdivisions. It is based on a kilometric rate of 2.2 pfennigs (0.524 cent) per ton up to a distance of 350 kilometers (217.5 miles) and 1.4 pfennig (0.333 cent) per ton beyond, plus terminal charges of 0.70 mark per ton (16.66 cents).

As indicating the extent to which the exceptional rates are utilized in Germany, in the following statement is shown the freight traffic on the great Prussian railway system in metric tons during certain

¹ Report of the Board of Trade Conference (Wyman & Sons, London).

years, and the percentage of the traffic conveyed at normal and at exceptional rates.

Freight traffic on the Prussian State railways.

Year.	Total tons.	Percentage conveyed at normal rates.	Percentage conveyed at exceptional rates.
1882.	105,036,517	40.9	59.1
1885.	86,106,992	38.7	61.3
1890.	118,907,870	53.2	46.8
1895.	146,653,849	54.33	45.67
1900.	205,682,212	35.73	64.27
1906.	283,288,622	35.68	64.32

By an inspection of the above figures it will be seen that in 1906 over 64 per cent of the merchandise carried by the Prussian railways came under the exceptional rates. On the Bavarian lines during the same period the percentage of the traffic under exceptional rates was 56.7.

The exceptional tariffs are complicated and form the principal difficulty of the German freight tariff. It is estimated that there are about 1,000 books published giving the freight rates of the different railway systems. To determine the cheapest rate of transportation in many cases requires the service of an expert, especially when the merchandise may be included under one or more of the exceptional tariffs.

All of the rates given in this report, unless specially mentioned otherwise, include the terminal charges, that is the charges for placing the cars at the freight stations at the disposition of the shippers or consignees for loading or unloading the goods.

Ordinarily loading and unloading is done by or at the cost of shipper and consignee, respectively, with the exception of piece goods or small consignments, which are handled by the railway companies. If by request the railway employees undertake the loading or unloading the charges are as follows:

Loading or unloading ordinary merchandise, per 100 kilos (220.46 pounds), 4 pfennigs (0.95 cent). Loading or unloading grain, podded grains, bran, malt, and oil seeds in bulk, 6 pfennigs (1.43 cents). For use of crane, in addition to loading charges, 3 pfennigs (0.71 cent). Minimum crane charge, 0.50 marks (11.9 cents). Maximum charge per car, 2 marks (47.6 cents). For shifting crane from one station to another, 3 marks (71.4 cents).

In addition to the above there are other fees exacted by the railways of Germany, of which the following are examples:

	Marks.
Freight bills to be filled out by the shipper, each	0.01 (0.24c.)
Freight bills in quantities of 100	.75 (17.85c.)
International freight bills, each	.02 (0.48c.)
International freight bills, in quantities of 100	1.50 (35.7c.)
Freight bills printed specially with shipper's name, 1,000	8.00 (\$1.90)
International freight bills printed specially with shipper's name, 1,000	16.00 (\$3.81)
Freight bills printed with shipper's name on margin, 1,000	8.50 (\$2.02)
International freight bills printed with shipper's name on margin, 1,000	17.00 (\$4.04)

	Marks.
Customhouse declaration and tax statements, on sheet-----	0.03 (0.71c.)
Customhouse declaration and tax statements, one-half sheet-----	.01 (0.24c.)
Customhouse declaration and tax statements, 100 full sheets-----	2.40 (57.1c.)
Customhouse declaration and tax statements, 100 one-half sheets-----	.70 (16.7c.)
Statistical report declarations, single-----	.01 (0.24c.)
Statistical report declarations, 100-----	.80 (19.0c.)
Statistical report by forwarder of foreign goods, single-----	.02 (0.48c.)
Statistical report by forwarder of foreign goods, 100-----	1.80 (42.8c.)
For filling out Nos. 1, 2, 5, and 6 as above, each-----	.10 (2.4c.)
For filling out duplicates-----	.10 (2.4c.)
For filling out receipts for goods-----	.10 (2.4c.)
For government stamp on freight bills, per 100-----	.10 (2.4c.)
For government stamp on international freight bills, per 100-----	.20 (4.8c.)

Weighing fees.

For piece of package for 100 kilograms (220 pounds)-----	.05 (1.2c.)
For carload quantities, per 100 kilograms-----	.04 (0.95c.)
For weighing carloads at one time-----	1.00 (23.8c.)

Counting fees.

For counting pieces or packages, per 20 packages-----	.10 (2.4c.)
Minimum charge on one freight bill-----	.20 (4.8c.)
Maximum charge on one freight bill-----	3.00 (71.4c.)
For carloads up to 20 pieces-----	.10 (2.4c.)
Minimum per car-----	1.00 (23.8c.)
Maximum per car-----	3.00 (71.4c.)

Warehouse charges.

In covered rooms, 24 hours per 100 kilograms-----	.10 (2.4c.)
In open spaces, 24 hours per 100 kilograms-----	.04 (0.95c.)
For each square meter, 10 days or less-----	.02 (0.48c.)
For demurrage, per car, each 24 hours after first day-----	2.00 (47.6c.)
For demurrage, per car, each 24 hours after second day-----	3.00 (71.4c.)
For demurrage, per car, each 24 hours after third day-----	4.00 (95.2c.)

Holidays not counted.

For countermanding order, per car, 2 marks (47.6 cents).

Customhouse charges.

For switching cars to customhouses, per 100 kilograms-----	.04 (0.95c.)
Maximum per car-----	.50 (11.9c.)
Switching and weighing 100 kilograms or less-----	.10 (2.4c.)
Maximum per car-----	6.00 (\$1.43)
Weighing car on track scales-----	1.50 (35.7c.)
For unloading or loading carloads-----	6.00 (\$1.43)
For unloading or loading without reweighing, per 100 kilograms-----	.04 (0.95c.)
Maximum per car-----	4.50 (\$1.07)
Opening and closing packages for inspection, each-----	.10 (2.4c.)
Opening and closing packages and repacking-----	.30 (7.1c.)
For covering dutiable goods with canvas, carload-----	.50 (11.9c.)
For covering and plumping each package-----	.20 (4.8c.)
For roping and plumping with lead, each package-----	.50 (11.9c.)
For hoops, iron bands, and nailing each piece-----	.10 (2.4c.)
For roping canvas covers to cars, per meter, rope-----	.02 (0.48c.)
For sealing with lead seals, per car-----	.75 (17.8c.)
For stamping each piece of iron or wood-----	.02 (0.48c.)
Minimum charge-----	1.00 (23.8c.)
For stamping each sack-----	.01 (0.24c.)

	Marks.
For use of canvas covers, 100 kilometers (62 miles) per car, or less	1. 50 (35. 7c.)
For use of canvas covers, each additional cover	. 50 (11. 9c.)
Minimum charge per 100 kilometers (62 miles)	2. 00 (47. 6c.)
Extra charge for use of covers after delivery, each 24 hours	. 50 (11. 9c.)
Disinfections, per car	1. 00 (23. 8c.)

The regulations governing the traffic on the German railways are given in "Deutscher Eisenbahn Gütertariff, Teil I, Abteilung A," with its supplement. The "Deutscher Eisenbahn Gütertariff, Teil I, Abteilung B," contains the classification of merchandise, supplementary charges, etc.

QUESTION I.—COAL RATES.

Each state system of railways in Germany, such as the Prussian, Bavarian, Saxon, Würtemburg, Baden, etc., has its own schedule of freight rates, but, as stated before, they differ slightly from each other. The rates given in the following schedules are those which, with a few modifications, prevail in the interstate traffic.

In the general carload freight classification, coal is placed under Special Tariff III, the rates for which, as shown in the table of normal rates, page 12, are 2.6 pfennigs (0.619 cent) per ton-kilometer for distances from 1 to 100 kilometers (0.62 to 62.1 miles), and 2.2 pfennigs (0.524 cent) for distances over 100 kilometers, with terminal charges per ton as follows: Sixty pfennigs (14.28 cents) for distances up to and including 50 kilometers (31.05 miles), 90 pfennigs (21.42 cents) per ton, from 51 kilometers (31.7 miles) to 100 kilometers, and 120 pfennigs (28.56 cents) for all distances over 100 kilometers.

The great bulk of the German coal traffic, however, is transported at exceptional rates; the principle ones are as follows:

In the direct traffic on all the German railways, from the German coal-mining centers, except when other exceptional rates apply, coal may be shipped to all parts of the Empire under the exceptional tariff for raw materials (exceptional tariff 2). In carload lots of not less than 10 metric tons, the rates are as follows: Up to 350 kilometers (217.5 miles), 2.2 pfennigs (0.524 cent) per ton-kilometer; over 350 kilometers, 1.4 pfennigs (0.333 cent) per ton-kilometer, with terminal charges of 70 pfennigs (16.66 cents) per ton.

As an example, the rate from Herne, in the Westphalian coal district, to Munich, a distance of 688 kilometers (427.5 miles), is calculated as follows:

	Pfennigs.
350 by 2.2	770
338 by 1.4	473. 2
Terminal charge	70
	<hr/>
	1, 313. 2

Discarding the pfennigs less than 5, the rate is 1,310 pfennigs (\$3.12), as given in the "Allgemeine Kilometer-Tariftable."'

As illustrating the above exceptional rate, in the following table are shown the rates on coal in not less than 10-ton shipments from the

principal German mining districts to 10 of the German cities, together with the distances in kilometers and miles:

Coal freight rates per metric ton (2,204.6 pounds), in carload lots of not less than 10 tons, from various mines, with distances from the mines to the points named.

To--	From Herne, Westphalia.				From Zwickau, Saxony.				From Zabrorze, Silesia.			
	Distance.		Rate.		Distance.		Rate.		Distance.		Rate.	
	Kilo- me- ters.	Miles.	Marks.	Dol- lars.	Kilo- me- ters.	Miles.	Marks.	Dol- lars.	Kilo- me- ters.	Miles.	Marks.	Dol- lars.
Nuremberg.....	514	319.38	10.70	2.55	263	163.42	6.50	1.55	752	467.27	14.00	3.33
Würzburg.....	412	256.0	9.30	2.21	319	198.22	7.70	1.83	832	516.98	15.10	3.59
Munich.....	688	427.5	13.10	3.12	407	252.9	9.20	2.19	833	517.6	15.20	3.62
Augsburg.....	627	389.6	12.30	2.93	410	254.76	9.20	2.19	843	523.81	15.30	3.64
Lindau.....	694	431.23	13.20	3.14	567	352.32	11.40	2.71	1,007	625.72	17.60	4.19
Passau.....	732	454.84	13.70	3.26	387	240.47	8.90	2.12	701	435.58	13.30	3.17
Regensburg.....	615	382.14	12.10	2.88	270	167.77	6.60	1.57	702	436.2	13.30	3.17
Baireuth.....	535	332.43	11.00	2.62	171	106.25	4.50	1.07	695	431.85	13.20	3.14
Hof.....	561	348.59	11.40	2.71	97	60.27	2.80	.67	661	410.73	12.80	3.05
Bamberg.....	482	299.5	10.20	2.43	219	136.08	5.50	1.31	774	480.94	14.30	3.40

The longest distance which coal is hauled in Germany is probably from Herne, in Westphalia, to Bajohren, in the northeastern part of the Empire near Memel, 1,321 kilometers (821 miles). The freight per ton is 22 marks (\$5.24).

The exceptional rate on Lower Silesian coal to Berlin and suburbs is 1.96 pfennigs (0.466 cent) per ton-kilometer plus a terminal charge of 70 pfennigs (16.66 cents) per ton.

The rate was established to place the Lower Silesian coal on a level with coal from Upper Silesia in the markets of Berlin and suburbs and is based on the average rate on shipments of coal from Upper Silesia.

SILESIAN COAL.

From the Upper Silesian coal mines to Danzig and its suburbs, and to Stettin and Swinemünde, there is an exceptional tariff for coal, when shipped in lots of at least 45 tons, and intended for bunker purposes of seagoing steamers, not those engaged in the local traffic between the ports of East and West Prussia and Pomerania.

The rate is 1.34 pfennigs (0.319 cent) per ton-kilometer plus a terminal charge of 60 pfennigs (14.28 cents) per ton. For cars whose loading weight is more than 10 tons but less than 15 tons the freight is calculated on a weight of 10 tons.

This tariff was made to enable Silesian coal to compete with foreign coal and to place it on a more equitable basis with Westphalian coal, as the latter may be transported cheaper by water via Rotterdam to Stettin and Swinemünde than the Silesian coal.

From the Upper and Lower Silesian coal mines to East and West Prussia and Hinter Pomerania, in shipments of 35 and 45 tons, or yearly shipments of 4,000 tons, the exceptional rate is 1.46 pfennigs (0.347 cent) per ton-kilometer plus 60 pfennigs (14.28 cents) per ton terminal charges.

To Vor-Pomerania, Uckermark, and Mecklenburg the rate for Silesian coal is not to exceed 1.52 pfennigs (0.362 cent) per ton-kilometer with terminal charges of from 30 to 60 pfennigs (from 7.14 to 14.28 cents) per ton.

To East and West Prussia, north of the line Putzig-Danzig-Marienburg-Königsberg-Insterburg-Goldap, the rate is up to 535 kilometers (332.4 miles), 1.46 pfennigs (0.347 cent) per ton-kilometer; from 536 kilometers (333 miles) to 700 kilometers (436 miles), 1.44 pfennig (0.343 cent) per ton-kilometer, and over 700 kilometers 1.42 pfennigs (0.338 cent) per ton-kilometer, the terminal charges in each case being 60 pfennigs (14.28 cents) per ton.

These rates were established to develop the sale of native coal in the localities mentioned in competition with coal from foreign countries, principally from Great Britain.

The exceptional rate of coal from Lower Silesia to Dresden and points beyond is 2.1 pfennigs (0.5 cent) per ton-kilometer, with terminal charges of 30 pfennigs (7.14 cents) per ton.

The concession granted for Silesian coal sent to Dresden and beyond was for the purpose of enabling it to successfully compete with Bohemian brown coal and as a compensation for the reduced exports of the German coal to Russia.

To increase the export of Silesian coal to Denmark (Seeland, Laaland, Falster) via Warnemunde, the rate for shipments of at least 45 tons is 1.34 pfennigs (0.319 cent) per ton-kilometer plus a terminal charge of 45 pfennigs (10.71 cents) per ton, inclusive of the charge of hauling the coal from the mines to the shipping station.

WESTPHALIAN COAL.

To facilitate the distribution of German coal through the Rhine ports of Duisburg, Hochfeld, and Ruhrort, a special rate is made on shipments from the Ruhr district to those localities. The basis of the rate is 2.5 pfennigs (0.595 cent) per ton-kilometer, plus a terminal charge of 90 pfennigs (21.42 cents) per ton, inclusive of the hauling charges from the mines to the shipping stations and the port charges. The above is the rate basis for 10 tons; for 12.5 tons, 15, and 20 tons the rate is lower—for instance, the freight charges from Herne on 10 tons to Ruhrort, a distance of 34 kilometers (21.13 miles), is 17.50 marks (\$4.17), while the rate for 12.5 tons is 21 marks (\$5), for 15 tons 24.50 marks (\$5.85), and for 20 tons 31.50 marks (\$7.50).

From the Ruhr district there is also an exceptional rate on coal shipped in lots of at least 45 tons, or 4,000 tons in one year, to the furnaces rolling mills, etc., of the Sieger, Lahn, and Dill districts.

The basis of the rate is 1.4 pfennigs (0.333 cent) per ton-kilometer plus 60 pfennigs (14.28 cents) terminal charges.

To the Georg-Marien furnaces and Osnabrück the rate is 1.5 pfennigs (0.357 cent) per ton-kilometer and to Vienenburg 1.6 pfennigs (0.38 cent), plus the same terminal charges as above.

The rates were established to promote the iron-ore and steel industries of the districts mentioned.

The rates on coal from the Ruhr district to Schleswig-Holstein, Lübeck, Mecklenburg, Prignitz, and adjoining stations is according to the group tariffs of the dispatching stations. The rate is variable,

depending upon the competition of English coal. At present it is about the same as the rate when the coal is shipped for export to the Elbe, Weser, and Ems ports in large shipments, as given below.

The rate was made because the previous cost of transportation to the districts was so high that foreign coal had to be used, even by the military authorities of the Ninth Army Corps.

The rate for the Ruhr coal, when exported to Denmark in lots of at least 45 tons, via Warnemunde is the same as for Silesian coal, namely, 1.34 pfennigs (0.319 cent) per ton-kilometer plus a terminal charge of 45 pfennigs (10.71 cents) per ton, inclusive of the charge of hauling the coal from the mines to the shipping stations. When sent via Bamdrup and Hvidding the rate is 1.32 pfennigs (0.314 cent) plus the same terminal and hauling charges.

When sent to the Elbe, Weser, and Ems ports, in lots of at least 45 tons or for shipments of at least 4,000 tons in one year, Ruhr coal pays rates according to the group tariffs. The rates for export, for example, from Wanne to Hamburg are 1.40 pfennigs (0.333 cent) per ton-kilometer; to Bremen, 1.65 pfennigs (0.393 cent); to Bremerhaven and Geestemünde, 1.31 pfennigs (0.312 cent); and to Emden, 1.28 pfennigs (0.307 cent), plus terminal charges in each case of 60 pfennigs (14.28 cents) per ton and hauling charges from the mines to the shipping stations of 15 pfennigs (3.57 cents) per ton.

These rates were established to increase the use of native coal in the North Sea ports and the adjacent country and to meet the competition of English coal in the export trade.

To Emden, Emden Outer Port, Leer, and Papenburg, in shipments of from 200 to 300 tons for export to European ports in the Mediterranean and Black Sea, the rate on Westphalian coal is on the average 1.23 pfennigs (0.293 cent) per ton-kilometer plus terminal charges of 60 pfennigs (14.28 cents) and mine charges of 15 pfennigs (3.57 cents) per ton.

The rate was made to develop the export of German coal through the Ems ports instead of through foreign ports.

For export of Westphalian coal to Holland the rate, when shipped in lots of 45 tons, or in a yearly quantity of 4,000 tons, to the ports and important adjacent stations, is from 2.19 to 1.79 pfennigs (0.521 to 0.426 cent) per ton-kilometer, and if sent in special trains carrying from 200 to 300 tons the rate is from 1.87 to 1.52 pfennigs (0.445 to 0.362 cent) per ton-kilometer plus a terminal charge in each case of 35 pfennigs (8.33 cents) per ton.

The rate was established to increase the consumption of German coal in Holland.

For export to Belgium the rate is 1.7 pfennigs (0.405 cent) per ton-kilometer when shipped in lots of at least 45 tons, or a yearly amount of 4,000 tons, and when shipped in special trains carrying from 200 to 300 tons the rate is from 1.73 to 1.47 pfennigs (0.412 to 0.35 cent) per ton-kilometer, plus a terminal charge in each case of 40 pfennigs (9.52 cents) per ton. The rate when shipped to the above ports and stations, if for local consumption and not for export, is 1.9 pfennigs (0.452 cent) per ton-kilometer.

The rate on Westphalian coking coal when shipped to the Franco-German frontier station of Fentsch, Novéant, and Amanweiler is as follows: To Fentsch, 2 pfennigs (0.476 cent) per ton-kilometer plus

terminal charge of 60 pfennigs (14.28 cents) per ton; to Amanweiler, about 1.87 pfennigs (0.445 cent) per ton-kilometer, and terminal charges of 35 pfennigs (8.33 cents) per ton; and to Novéant, about 1.77 pfennigs (0.421 cent) per ton-kilometer, with the same terminal charges as to Amanweiler.

The rate was made to increase the consumption of German coking coal in the iron and steel districts of eastern France.

The rate on coking coal and coke for the use of the furnaces in Alsace-Lorraine, Luxemburg and Saar districts from the Ruhr, Aix-la-Chapelle and Saar districts is as follows:

From 80 to 350 kilometers (49.7 to 217.5 miles), 2.2 pfennigs (0.524 cent) per ton-kilometer, with terminal charges as follows:

From 80 to 200 kilometers (49.7 to 124.3 miles), 50 pfennigs (11.9 cents) per ton.

From 201 to 290 kilometers (124.9 to 180.2 miles), 40 pfennigs (9.52 cents) per ton.

From 291 to 350 kilometers (180.8 to 217.5 miles), 20 pfennigs (4.76 cents) per ton.

The rate increment over 350 kilometers is 1.4 pfennigs (0.333 cent) per ton-kilometer. The rate was established to enable the German coal to compete with foreign coal and coke in the Minette and Saar districts.

The rate on coal from Gustavsburg, in the Hessian Province of Starkenburg to Aschaffenburg and stations of the Bavarian State Railway, made to increase the traffic on the Prussian railway system, is 2.2 pfennigs (0.524 cent) per ton-kilometer plus terminal charges of 70 pfennigs (16.66 cents), 40 pfennigs (9.52 cents), and 36 pfennigs (8.57 cents), respectively.

The rate for Belgian coal to Rheinland-Westphalia is 2.1 pfennigs (0.5 cent) per ton-kilometer plus a terminal charge of 40 pfennigs (9.52 cents) per ton. This rate was given to Belgian coal imported into Germany on account of the concessions granted by the Belgian Government on German coal imported into Belgium.

The rate on coal shipped from stations on the lines of the Holland State Railway to the stations on the left bank of the Rhine (south-western district of the Prussian Railway system, including private connecting lines) is 2.2 pfennigs (0.524 cent) per ton-kilometer plus a terminal charge of 35 pfennigs (8.33 cents) per ton.

LIGNITE (BRAUNKOHL).

The freight rates for lignite are the same as those for coal when shipped from the German lignite mining centers to all parts of the Empire in direct traffic, except when other exceptional rates apply. As stated before, in carload lots of not less than 10 metric tons the rates are as follows: Up to 350 kilometers (217.5 miles), 2.2 pfennigs (0.524 cent) per ton-kilometer; over 350 kilometers, 1.4 pfennigs (0.333 cent) per ton-kilometer, with terminal charges of 70 pfennigs (16.66 cents) per ton.

The rate on lignite from mines in the Provinces of Brandenburg, Posen, Saxony, and Silesia, as well as in Brunswick, Anhalt, and in the Kingdom of Saxony to Berlin and suburbs, is 2.2 pfennigs (0.524 cent) per ton-kilometer, with a terminal charge of 30 pfennigs (7.14 cents) per ton.

The rate was made to meet the competition of foreign lignite in the localities mentioned.

For the most part the exceptional tariffs for coal shipped from the Ruhr district apply also to lignite.

From the shipping stations of the mines in the Rhine district the freight rate on lignite sent to Holland in lots of at least 45 tons, or for shipments amounting in one year to at least 4,000 tons, is up to 1.6 pfennigs (0.381 cent) per ton-kilometer, with a terminal charge of 30 pfennigs (7.14 cents) per ton.

The rate for lignite shipped from middle Germany to Denmark is as follows: Via Warnemunde, 1.34 pfennigs (0.319 cent) per ton-kilo; via Bamdrup and Hvidding, 1.32 pfennigs (0.314 cent) per ton-kilo, with terminal charge in each case of 45 pfennigs (10.71 cents) per ton.

The above rates were established to increase the export trade in German lignite.

REBATES.

When coal is shipped under the exceptional rate, which requires that a stated amount shall be sent in one year, the fact is noted on the bill of lading, and the exceptional rate for smaller shipments is paid at the time when the coal is shipped. At the end of the year the difference between the higher rate and that for a prescribed yearly quantity is refunded to the shipper, if the conditions have been fulfilled, within three months after filing the claim for the rebate.

As stated before, the terminal charges are for placing the cars at the freight stations at the disposition of the shippers or consignees for loading or unloading the coal. If the loading or unloading is done by the railway company an extra charge is made, according to the tariff of subsidiary charges given on page 17.

Coal is usually shipped in open cars built for the coal trade. They are of a capacity of 10, 25, 15, and 20 tons, and for the coke trade as high as 40 tons.

QUESTION II.—IRON ORE, STONE, LUMBER.

1. *Iron ore.*

In the general classification of freight in carloads iron ore, the same as coal, is placed under Special Tariff III, the rates for which, as shown in the table of normal rates, page 12, are 2.6 pfennigs (0.619 cent) per ton-kilometer for distances from 1 to 100 kilometers (0.62 to 62.1 miles), and 2.2 pfennigs (0.524 cent) for distances over 100 kilometers, with terminal charges per ton as follows: Sixty pfennigs (14.28 cents) for distances up to and including 50 kilometers (31.05 miles), 90 pfennigs (21.42 cents) from 51 to 100 kilometers (31.7 to 62.1 miles), and 120 pfennigs (28.56 cents) for all distances over 100 kilometers.

The greater part of the German iron-ore traffic, however, is transported at exceptional rates, the principal ones being as follows:

In the direct traffic on German railways and on foreign railways which grant the same rates, except when other exceptional rates ap-

ply, iron ore may be shipped to all parts of the Empire under the exceptional tariff for raw materials (exceptional tariff 2). In car-load lots of not less than 10 metric tons the rates are as follows: Up to 350 kilometers (217.5 miles), 2.2 pfennigs (0.524 cent) per ton-kilometer; over 350 kilometers, 1.4 pfennigs (0.333 cent) per ton-kilometer, with terminal charges of 70 pfennigs (16.66 cents) per ton. The rate for distances over 350 kilometers—450 kilometers, for instance—is calculated up to 350 kilometers at 2.2 pfennigs per ton, and for the distance over 350 kilometers, namely, 100 kilometers, at 1.4 pfennigs per ton.

In the local and exchange traffic of the Western State and Private Railways, the railways of southern Germany, Province of Saxony, Luxemburg, Belgium, France (Northern Railway), and Austria-Hungary, as well as from the ore mines of the middle and eastern Provinces to Silesian, Thuringian, and Harz furnaces, from Saxon stations to the Upper Silesian furnace districts, and between Saxon and Thuringian stations and from Breslau municipal harbors and Popelwitz (transfer station) to Upper Silesia, the rate on iron ore is as follows: Up to 50 kilometers (31.07 miles). 2 pfennigs (0.476 cent) per ton-kilometer; over 50 kilometers, 1.8 pfennigs (0.428 cent) per ton-kilometer, with terminal charges of from 80 to 120 pfennigs (19.04 to 28.56 cents), the minimum rate being 2.2 pfennigs (0.524 cent) per ton-kilometer without terminal charge.

From Vienna and Hungarian stations to upper Silesia and from Altwasser, Gottesberg, and Neurode to Mährisch-Ostrau and Trzy-metz the rate is 2.2 pfennigs (0.524 cent) per ton-kilometer without terminal charge, and from Mährisch-Ostrau, Hruschau, and Schönbrunn to Upper Silesia the rate is 1.8 pfennigs (0.428 cent) per ton-kilometer, plus a terminal charge of 60 pfennigs (14.28 cents) per ton.

To the furnace stations and lead-smelting works, from Belgium and the Franco-German frontier transit stations, the rate is as follows:

Up to 100 kilometers (62.14 miles) 1.8 pfennigs (0.428 cent) per ton-kilometer.

From 101 to 190 kilometers (62.76 to 118.06 miles) 1.5 pfennigs (0.357 cent) per ton-kilometer.

Over 190 kilometers (118.06 miles) 1 pfennig (0.238 cent) per ton-kilometer, plus a terminal charge of 70 pfennigs (16.66 cents) per ton.

These rates were established to increase the sources of ore supply, especially the Minette ores from Alsace-Lorraine and Luxemburg, in place of other foreign ores and in the interest of the western furnace districts by supplying them with French ores.

The exceptional rate on iron ore for furnace use from the German seaports, and from Danish, Swedish, and Norwegian stations to Bohemian stations is as follows: Up to 100 kilometers (62.14 miles) 2.2 pfennigs (0.524 cent) per ton-kilometer; above 100 kilometers (62.14 miles) 1.5 pfennigs (0.357 cent) per ton-kilometer, plus a terminal charge of 70 pfennigs (16.66 cents) per ton.

The above rate also applies to shipments of iron ore from Hungary and Steiermark to Upper Silesia.

From the shipping stations of the Lahn, Dill, and Sieg districts to the furnace stations of the Ruhr, Saar, Aix-la-Chapelle, Luxem-

burg, and Alsace-Lorraine districts, the rate on iron ore is 1.25 pfennigs (0.298 cent) per ton-kilometer, plus a terminal charge of 60 pfennigs (14.28 cents) per ton for all distances.

The rate was established to foster the ore-mining industries on the rivers Lahn, the Dill, and the Sieg, and to counterbalance the unfavorable conditions under which the above mines operate in competition with the districts which have a reduced iron-ore and coke tariff.

For the iron ore traffic between the stations of the industrial districts of Lahn, Dill, Siegerland, and Brilon, the rate is 1.5 pfennigs (0.357 cent) per ton-kilometer, plus a terminal charge of 60 pfennigs (14.28 cents) per ton-kilometer for all distances.

The rate on iron ore from Kirchlengern (Hanover district) to the Georgs-Marien furnace near Osnabrück is 1.6 pfennigs (0.381 cent) per ton-kilometer, plus a terminal charge of 70 pfennigs (16.66 cents) per ton.

The rate was established to make it possible for the Porta ore to compete in Osnabrück with foreign ores.

There are exceptional rates on iron ore shipped in lots of at least 45 tons from Stettin, Swinemünde, Danzig, and Neufahrwasser to the Silesian furnace districts; from the German North Sea ports and Kiel to the Rhine-Westphalian furnace district, and from the Elbe and Weser ports and Lübeck to Vienenburg.

The rate from Stettin, Swinemünde, Danzig, and Neufahrwasser is 1.34 pfennigs (0.319 cent) per ton-kilometer, plus a terminal charge of 60 pfennigs (14.28 cents) per ton.

This rate is also applicable to foreign iron ore shipped from Stettin to Mährisch-Ostrau.

The rate to Vienenburg is 1.5 pfennigs (0.357 cents) per ton-kilometer, plus terminal charges of 70 pfennigs (16.66 cents) per ton, which is about the average rate for iron ore shipped from North Sea and Baltic ports to Rhine-Westphalian and Upper Silesian districts.

The rate on iron-ore traffic between Bavaria and Frankfort on the Main, Kassel, Gustavsburg, Mayence, and Mannheim is 2.2 pfennigs (0.524 cent) per ton-kilometer without terminal charges.

This rate was made to compete with ore shipped via the transfer station of the Baden railway at Mannheim.

The rate on iron ore between the Prussian-Saxon competing stations and Bavarian stations is from 1.83 pfennigs (0.436 cent) per ton-kilometer, plus a terminal charge of 60 pfennigs (14.28 cents) per ton, to 1.5 pfennigs (0.357 cent) per ton-kilometer, plus a terminal charge of 30 pfennigs (7.14 cents) per ton.

From German and Dutch stations to Russia, excepting Poland in the Dutch-German-Russian Association and Frontier Traffic, the rate on iron ore per ton-kilometer over the German railways is 1.75 pfennigs (0.417 cent).

In the direct traffic there is no terminal charge, as the railways receive a portion of the terminal charges collected by the Russian railways. In the frontier traffic the terminal charge is 30 pfennigs (7.14 cents) per ton.

Ores of various kinds used for the construction of German public or private roads and the maintenance of same are carried at excep-

tional rates over the Prussian railways and over other railways which have accepted the same rate basis.

The rate is as follows:

Up to 50 kilometers (31.07 miles), 2.6 pfennigs (0.619 cent) per ton-kilometer; from 51 to 200 kilometers (31.69 to 124.3 miles), 1.0 pfennig (0.238 cent) per ton-kilometer; over 200 kilometers, 1.4 pfennigs (0.333 cent) per ton-kilometer for the whole distance carried, plus terminal charges of 60 pfennigs (14.28 cents).

As an example of the calculation of the rate, if the distance were 200 kilometers (124.3 miles) the rate would be per ton:

	Pfennigs.
50 by 2.6-----	130
150 by 1.0-----	150
1 by 60 -----	60
	<hr/>
	340 (80.9 cents).

For a distance of 220 kilometers (136.7 miles) the rate would be:

	Pfennigs.
220 by 1.4 -----	308
1 by 60 -----	60
	<hr/>
	368 (87.6 cents).

2. Stone.

In the general carload freight classification, stone is placed under Special Tariffs II and III, as follows:

SPECIAL TARIFF II.

STONE UNPACKED OR LOOSE IN HAY, STRAW, ETC., OR CRATED OR IN OPEN BOXES, AND IN CASE OF STONE FOR EXPORT IN SUITABLE PACKING.

1. Cut stone not named in Special Tariff III or otherwise specially mentioned.
2. Mill stones formed of several pieces, not mentioned in Special Tariff III, molded mill stones.
3. Artificial stone not named in Special Tariff III, or otherwise specially mentioned, corundum or emery wheels, etc.

SPECIAL TARIFF III.

Packing same as Special Tariff II.

1. Stone otherwise not mentioned, rough, or roughly hewn, only split not sawed, with the exception of marble slabs and so-called Belgian granite, sawed up to a thickness of 16 centimeters (6.3 inches) stone chips, broken stone, etc.
2. Building stone, cut to dimensions, stone for steps.
3. Foundation stone for graves and monuments and for grave and monument inclosures.
4. Pavement stone, curbstones, border and milestones, slabs, excepting those of marble and so-called Belgian granite, up to 16 centimeters (6.3 inches) thick.
5. Hollowed stone; stone for crib work, troughs for well and spring curbing, gutter stone and stone for culverts, etc.

Stone under paragraphs from 2 to 5, also polished and ground.

6. Mill stones in one piece, mill stones made of sandstone, also made of several pieces, rollers, and grindstones.

(Pumice stone, whetstones, emery, corundum wheels, etc.)

7. Artificial stone, otherwise not mentioned; stone in the form and condition named in paragraphs 2 to 5, building and roofing stone, facing stone, floor stones, and filter slabs.

8. Stone otherwise not mentioned, natural and artificial; ground, crushed, in cubes for making pavements, etc., suitably packed.

The rate for stone included under Special Tariff II, as shown in table of normal rates, page 12, is as follows for carload shipments of at least 10 tons: 3.5 pfennigs (0.833 cent) per ton-kilometer for all distances from 1 to 50 kilometers (0.62 to 31.07 miles) plus a terminal charge of 60 pfennigs (14.28 cents) per ton; 90 pfennigs (21.42 cents) per ton from 51 to 100 kilometers (31.7 to 62.14 miles); and 120 pfennigs (28.56 cents) per ton for all distances over 100 kilometers.

The rate for Special Tariff III is 2.6 pfennigs (0.619 cent) per ton-kilometer up to and including 100 kilometers (0.62 to 62.14 miles), and 2.2 pfennigs (0.524 cent) per ton-kilometer for all distances over 100 kilometers, with the same terminal charges as for Special Tariff II.

The above and the following rates for stone are for shipments of not less than 10 tons, unless otherwise mentioned. There are exceptional rates for stone in force in different parts of Germany, the most important of which are as follows:

Stone for public and private road-making purposes, sidewalks, bridges, and quays, and their maintenance, in Germany and in the Duchy of Luxembourg; quarry and field stones, boulders, roughly cut border and milestones, etc., are transported to all parts of Germany and to the Duchy of Luxembourg at an exceptional rate.

The basis of the rate is as follows:

Up to 50 kilometers (31.07 miles), 2.6 pfennigs (0.619 cent) per ton-kilometer; from 51 to 200 kilometers (31.7 to 124.3 miles), 1 pfennig (0.238 cent) per ton-kilometer; and for distances over 200 kilometers the rate is calculated at 1.4 pfennig (0.333 cent) for the total distance. The terminal charge in each case is 60 pfennigs (14.28 cents) per ton.

Stone mentioned in Special Tariff III has an exceptional rate in the district of the former Hessian-Ludwigs Railway; also in the traffic with Nassau, Upper Hessian, and Westerwald stations, and in the direct traffic with southern German stations and beyond.

The basis of the rate is 2 pfennigs (0.476 cent) per ton-kilometer, and terminal charges of 60 pfennigs (14.28 cents) and 30 pfennigs (7.14 cents) per ton, respectively. In the direct traffic with the southern German stations the terminal charge is 30 pfennigs (7.14 cents) per ton.

From the Silesian stations to Sosnowice, Herby, Kattowitz, Russian frontier stations, stone of Special Tariff III is transported at the following rate:

Up to 100 kilometers (62.14 miles), 2.6 pfennigs (0.619 cent) per ton-kilometer; above 100 kilometers, at the rate of 2.2 pfennigs (0.524 cent) per ton-kilometer, with a terminal charge of 30 pfennigs (7.14 cents) in each case.

The rate was made to develop the export trade in German stone with Russia.

The rate on quarry, building, and paving stone from Piesburg and stations on the line from Osnabrück-Rhein-Gildhais to the Ems ports is 2.2 pfennigs (0.524 cent) per ton-kilometer, with a terminal charge of 60 pfennigs (14.28 cents) per ton when shipped in lots of not less than 30 tons from one shipper to one consignee. On rough stone from Piesburg to Bremen the rate is same as above, with a terminal charge of 70 pfennigs (16.66 cents) per ton.

On rough quarry stone, not worked, of dimensions not greater than one-half meter (1.62 feet) wide, long, or high the rate from Piesburg and near-by stations to Bremen, Bremerhaven, Geestemünde, Brake, Nordenham, and Wilhelmshaven is from 1.8 to 1.62 pfennigs (0.428 to 0.386 cent) per ton-kilometer, with terminal charges of 60 pfennigs (14.28 cents) per ton.

The rate on rough basalt stone from Dehrn, Heckholzhausen, and Steeden to Oberlahnstein, for export to Holland, is based on the rate of Special Tariff III, given on page 28.

The rate on paving stone, crushed stone, etc., for road construction from the stations on the Prussian and Saxon state railways and from the middle German private railway stations to Berlin and suburbs is from 2.6 to 2.2 pfennigs (0.619 to 0.524 cent) per ton-kilometer, with a terminal charge of 60 pfennigs (14.28 cents) per ton for distances up to 250 kilometers (155.3 miles); over that distance the terminal charge is 30 pfennigs (7.14 cents) per ton.

The rate on refuse from quarries, ashes of all kinds, sand, gravel, etc., from all stations on the state railways to the coal districts of Ruhr, Saar, Upper and Lower Silesia, Aix la Chapelle, Eschweiler, is 1.5 pfennigs (0.357 cent) per ton-kilometer up to 20 kilometers (12.4 miles), and for each additional ton-kilometer (0.62 mile) 1.1 pfennigs (0.262 cent), with terminal charges of 30 pfennigs (7.14 cents) per ton.

This rate is an experimental one, to promote the economical operation of the coal mines in the districts named.

In the traffic between Holland, Germany, and Russia, not including Poland, there are three exceptional tariffs, namely, 1A, 2A, 2B, which cover a number of products. Under exceptional tariff 2A, are included lithograph stone, whetstones, fine and artificial, basamite, emery and corundum wheels, millstones, all other stone rough or only roughly hewn, with the exception of stone bricks, flat-stone tiles, stone-roofing tiles, basalt, etc., and stone mentioned in exceptional tariff 2B, marble bathtubs, monuments of marble or other stone, all other cut stone, with the exception of flagstones, slabs, step stone, base stone, stone door and window facings, stone posts and pillars, made of marble, sandstone, etc.

Under exceptional tariff 2B are included beton stone, flint stone, stone for filters, slabs for filters, millstones made of one piece, or when made of sandstone of several pieces, rough whetstones, grindstones, Kiln stones, Dinas stone, pyrogranite, etc.

The rates are as follows over the German railway for the through traffic to Russia in not less than 10-ton lots: Exceptional tariff 2A, 2 pfennigs (0.476 cent) per ton-kilometer; exceptional tariff 2B, 1.75 pfennigs (0.417 cent) per ton-kilometer, without extra terminal charge.

For traffic to the Russian frontiers only the above rates apply except that there is a terminal charge of 30 pfennigs (7.14 cents) per ton in addition.

The exceptional rate on facing and roofing stone from Siegersdorf in Silesia, Raucha, Freiwalde, Langenberg and Nieder-Ullersdorf, to East Switzerland and Lindau (transit) is 1.48 pfennigs (0.352 cent) per ton-kilometer, with a terminal charge of 60 pfennigs (14.28 cents) per ton.

From Siegersdorf, in Silesia, and Ullersdorf to Holland, and from Heidegersdorf, Laban, Siegersdorf, and Ullersdorf to Belgian stations, the rate on facing stone is from 1.775 to 1.69 pfennigs (0.422 to 0.402 cent) per ton-kilometer, with a terminal charge of 60 pfennigs (14.28 cents) per ton.

The exceptional rate on lithographic stone from Pappenheim, Treuchtlingen, and Solnhofen in Bavaria, to German, Belgian, and Dutch seaports, and to Sweden and Norway, is from 3.483 to 3.29 pfennigs (0.829 to 0.783 cent) per ton-kilometer, plus terminal charges of from 60 to 1.20 pfennigs (14.28 to 28.56 cents) per ton.

The exceptional rate for roofing slates from stations near the slate quarries shipped to all parts of Germany, and for export to Austria-Hungary, for distances up to 200 kilometers (124.3 miles) is 2.6 pfennigs (0.619 cent) per ton-kilometer, and above 200 kilometers, 1.4 pfennigs (0.333 cent) with terminal charges per ton as follows: 60 pfennigs (14.28 cents) for distances up to and including 50 kilometers (31.05 miles); 90 pfennigs (21.42 cents) from 51 to 100 kilometers (31.7 to 62.1 miles) and 120 pfennigs (28.56 cents) for all distances over 100 kilometers.

The rate was made to meet the competition of foreign slates coming by water.

3. *Lumber.*

In the general classification of freight in carload lots, wood is placed under Special Tariffs I, II, and III, as follows:

Special Tariff I.—Beams, boards, blocks, and planks (the latter also planed, grooved, tongued, perforated, fluted, or otherwise worked), as well as slabs from species which are not worked or have their origin in the forests of middle Europe, as, for example, box-wood, cedar, lemon or candle wood, cypress, ebony, red ebony (Grenadillo), hickory, laurel, mahogany, olive, citron, lignum-vitæ, pitch pine, yellow pine, satinwood, teak, and American black walnut.

By species is meant the botanical species.

Special Tariff II.—Wood (excepting the species mentioned in Special Tariff I, which is not worked nor has its origin in the forests of middle Europe).

1. Logs, split or hewn, billets, and faggots, in as far as they are not mentioned in Special Tariff III.

2. Willow wood, 1 year old, staves, and wood for same, in as far as it does not come under Special Tariff III, No. 7.

3. Sawed timber, also planed, tongued, and grooved, or otherwise worked. (a) Squared, in the form of beams, rafters, laths, cornices. (b) Wide, in the form of boards, planks, and floor planks. (c) Thin boards for parquette flooring.

4. Brush brooms.

5. Impregnated wood for telegraph poles, etc., not mentioned in Special Tariff III.

6. Shavings. (See also Special Tariff III.)

Special Tariff III.—Wood (excepting the species mentioned in special Tariff I, which is not worked nor has its origin in the forests of middle Europe).

1. Logs and poles, roughly hewn or split, wood for poles less than 10 centimeters (3.94 inches) in diameter, cut lengthwise one or more times, with bark on one side, and if impregnated at one end, billets less than 2.5 meters (8.5 feet) in length.

2. Roots and refuse wood.

3. Withes, hoopwood, and broom material not mentioned in Special Tariff II.

4. Railway ties, rough or impregnated.

5. Slabs, not more than 6 meters (19.7 feet) long, and not over 5 centimeters (1.97 inches) thick measured at the thin end, not including the bark.

6. Timber for mine supports, up to a thickness of 20 centimeters (7.87 inches), measured at the smallest end, not including the bark, and up to a length of 7 meters (23 feet), planks, etc., and up to a length of 6 meters (19.7 feet), and boards up to a length of 1.5 meters (4.92 feet).

7. Pickets from soft wood up to a length of 1.25 meters (4.1 feet) and 25 millimeters (0.98 inch) in thickness, unplaned, loose, or corded or wired, in bags or boxes, of which the wood is at least 12 millimeters (0.47 inch) thick, also the same planed for the export trade.

8. Dowels and pegs, in the rough; sawdust.

As shown in the table of normal rates, given on page 12 of this report, the basis of the rate of the above special tariffs are as follows:

Special Tariff I.—4.5 pfennigs (1.071 cents) per ton-kilometer for all distances, with terminal charges of 60 pfennigs (14.28 cents) per ton, for distances up to and including 50 kilometers (31.07 miles); 90 pfennigs (21.42 cents) for all distances between 51 and 100 kilometers; and for all distances over 100 kilometers 120 pfennigs (28.56 cents).

Special Tariff II.—3.5 pfennigs (0.833 cent) per ton-kilometer for all distances, with same terminal charges as above.

Special Tariff III.—2.6 pfennigs (0.619 cent) per ton-kilometer up to and including 100 kilometers (62.14 miles), and over 100 kilometers 2.2 pfennigs (0.524 cent) per ton-kilometer, with same terminal charges as above.

In addition to the above special tariffs for wood, there are a number of exceptional rates granted, the most important of which are the following:

Wood specified in Special Tariff III, together with wood waste, such as chips, etc., in carload lots of not less than 10 tons, is carried under the exceptional tariff for raw materials (exceptional tariff 2) unless other exceptional rates apply.

The rates are as follows: Up to 350 kilometers (217.5 miles), 2.2 pfennigs (0.524 cent) per ton-kilometer; over 350 kilometers, 1.4 pfennigs (0.333 cent) per ton-kilometer, with terminal charges of 70 pfennigs (16.66 cents) per ton. The rate for distances over 350 kilo-

meters—450 kilometers, for instance—is calculated up to 350 kilometers at 2.2 pfennigs per ton and for the distance over 350 kilometers at 1.4 pfennigs per ton.

Wood of Special Tariff II is carried under an exceptional tariff, the rate of which is 30 pfennigs (0.714 cent) per ton-kilometer for all distances, with terminal charges from 60 to 120 pfennigs (14.28 to 28.56 cents). This rate applies on the Prussian and most of the other German railways.

In the former district of Bromberg—that is, on the line Kolberg-Belgrad-Wulkowo-Schneidemühl-Posen-Strahlkowo and eastward and Schneidemühl-Berlin-Cüstrin-Frankfort-on-the-Oder, Callies-Arnswalde and Mulkowo-Stargard—wood of Special Tariff II is carried at the following exceptional rate: From 1–100 kilometers (0.62 to 62.14 miles), 3 pfennigs (0.714 cent) per ton-kilometer; 101–200 kilometers (62.76 to 124.3 miles), 2.8 pfennigs (0.666 cent) per ton-kilometer; 201–300 kilometers (124.9 to 186.4 miles), 2.6 pfennigs (0.619 cent) per ton-kilometer; 301–400 kilometers (187 to 248.5 miles), 2.4 pfennigs (0.571 cent) per ton-kilometer; plus terminal charges of 60 pfennigs (14.28 cents) per ton.

For distances over 400 kilometers the rate is 2.2 pfennigs (0.524 cent) per ton-kilometer plus terminal charges of 120 pfennigs (28.56 cents) per ton.

The rate on wood of Special Tariff II in the traffic between the transit stations of the Prussian and Prussian-Saxon lines and the Bavarian, Saxon, and Württemberg stations is from 2.95 to 1.82 pfennigs (0.702 to 0.433 cent) per ton-kilometer, plus terminal charges of 60 pfennigs (14.28 cents) per ton.

This rate was established to meet the competition of the Saxon competing stations.

From the stations of East and West Prussia, east of the Vistula to the East Prussian seaports, wood of Special Tariffs II and III, when intended for export to foreign countries, enjoys the following exceptional rates: Wood of Special Tariff II, 2.2 pfennigs (0.524 cent) per ton-kilometer; wood of Special Tariff III, 1.8 pfennigs (0.428 cent per ton-kilometer, with terminal charges in each case of 60 pfennigs (14.28 cents) per ton.

The rate was established to counterbalance the unfavorable position in which the products of the German forests were placed on account of the low freight rates granted Russian wood intended for export through East Prussian seaports.

Wood named in Special Tariffs II and III, when intended for export and carried distances over 100 kilometers (62.14 miles) from stations of the Prussian railway lines and those of the Southern German and Saxon lines, the exceptional rate is 2 pfennigs (0.476 cent) per ton-kilometer, with terminal charges of from 60 to 120 pfennigs (14.28 to 28.56 cents) per ton. For shipments from Bavaria which are intended for export to Belgium, which pass over the French railway lines, the maximum rate is 1.78 pfennigs (0.424 cent) per ton-kilometer plus the same terminal charges. In the direct traffic to Russia, excepting Poland, the shipper pays no terminal charges, as the German shipping stations receive about 55 pfennigs (13.09 cents) from the Russian terminal charges.

From Sosnowice, on the Russian frontier, to Bavarian stations, wood of Special Tariff III pays an exceptional rate of from 1.81 to

1.23 pfennigs (0.431 to 0.293 cent) per ton-kilometer, with no terminal charges.

The rate was made to meet the competition of foreign railways.

European logs shipped from Frankfort-on-the-Main, Kastel, Gustavsburg, Mayence, and Mannheim to Bavaria and Württemberg have an exceptional rate of 2.7 pfennigs (0.643 cent) per ton-kilometer plus terminal charges of 60 pfennigs (14.28 cents) per ton.

Round timber, more than 20 centimeters (7.87 inches), but not exceeding 30 centimeters (11.8 inches) in diameter, measured at the thinnest end, without bark, and up to 5 meters (16.4 feet) long, intended for mining purposes, when shipped to the mining districts of the Ruhr, Saar-Luxembourg, Alsace-Lorraine, Pfalz, Lahn, Dill, and Siegerland, is carried under exceptional rate for raw material (exceptional tariff 2) given on page 16 of this report.

The exceptional rate for pitch pine, yellow pine, American oak, poplar, and hickory, excepting American black walnut, when shipped from the Rhine and Main transfer stations to Switzerland and beyond, is 3 pfennigs (0.714 cent) per ton-kilometer plus terminal charges of 60 pfennigs (14.28 cents) per ton; regular rate is 4.5 pfennigs (1.07 cents) plus same terminal charges.

The exceptional rate on pitch pine when shipped from the Elbe and Weser ports, and Lübeck to the Swiss transfer stations is about 2.36 pfennigs (0.562 cent) per ton-kilometer, plus terminal charges of 120 pfennigs (28.56 cents) per ton; regular rate, same as above.

The rate was made to enable the above-named German seaports to compete with foreign ports in the traffic via Switzerland.

The exceptional rate on logs, poles, billets, roughly hewn, split, etc., more than 2.5 meters (8.2 feet) long, when shipped from Rhine-Westphalian stations, Hesse-Nassau stations to Belgium and stations on the Northern Railway of France, also between German stations and those of Holland, is, for distances up to 50 kilometers (31.07 miles), 2.7 pfennigs (0.643 cent) per ton-kilometer; above that distance the increment is 2.5 pfennigs (0.595 cent) per ton-kilometer, with a terminal charge of 60 pfennigs (14.28 cents) for all distances. The regular rate is 3 pfennigs (0.714 cent) per ton-kilometer, with the same terminal charge for all distances. The rate was established to increase the consumption of German wood in the countries named.

The exceptional rate on Middle European nut wood and logs from Bavarian and Bavarian-Prussian competition stations to Belgium is 2.4 to 1.46 pfennigs (0.571 to 0.347 cent) per ton-kilometer, the regular rates being 3 pfennigs (0.714 cent) per ton-kilometer; no terminal charges in either case.

The rate was made to complete the competitive rates of the French railways to Belgium.

The exceptional rate on European lumber, etc., from the same shipping stations as above to Holland is 2.4 pfennigs (0.571 cent) per ton-kilometer, plus terminal charges of 60 pfennigs (14.28 cents) per ton, the regular rate being 3 pfennigs (0.714 cent) per ton-kilometer, with the same terminal charges.

The rate was made to increase the exportation of European wood to Holland.

The exceptional rate on wood from Hessian-Nassau stations to French stations is 2.4 pfennigs (0.571 cent) per ton-kilometer, plus

terminal charges of from 60 to 80 pfennigs (14.28 to 19.04 cents) per ton.

To increase the export of German wood to France the exceptional rate on lumber shipped from German stations to Italy is 2.43 pfennigs (3 centimes; 0.578 cent) per ton-kilometer, plus terminal charges of 60 pfennigs (14.28 cents) per ton. The exceptional rate on lumber shipped from Russia to the east and west Prussian seaports for over-sea export to countries outside of Germany is from 2.2 to 1.8 pfennigs (0.524 to 0.428 cent) per ton-kilometer, without terminal charges, the regular rate being 3 pfennigs (0.714 cent) per ton-kilometer, plus terminal charges of 60 pfennigs (14.28 cents) per ton.

The exceptional rate on pine lumber barked of Special Tariff II when shipped from stations of the Province of East Prussia to stations beyond Berlin as far as the Elbe and eastward as far as the line Berlin-Elsterwerda, via Berlin, is 2.2 pfennigs (0.524 cent) per ton-kilometer, plus terminal charges of 120 pfennigs (28.56 cents) per ton. The regular rate is 3.5 pfennigs (0.833 cent) per ton, with the same terminal charges.

The rate was established for the period from December 20, 1908, to December 31, 1911, on account of the damages to trees, caused by the attacks of the nun moth, in the districts for which the favorable rate was made.

DISCRIMINATION AGAINST AMERICAN PINE.

By an inspection of the rates given in Special Tariffs I, II, and III it will be seen to what extent the Prussian Railway discriminated against American pine. The American wood is classified with the more valuable species, such as ebony, teak, walnut, etc., thus having to pay a higher rate than wood from the Middle European countries.

The American consul at Hanover in a recent report to the Department of State sent several bills of lading, which showed the difference in the rates paid on shipments of American and Swedish pine lumber from several of the German seaports to Hanover. One bill of lading was for a shipment of European pine boards from Bremen to Hanover at a rate of 49 marks (\$11.66) per 10 tons (Special Tariff II). Another was for a shipment of American pine boards between the same stations, but the rate was 67 marks (\$15.95) per 10 tons. The difference between the two rates per carload of 10 metric tons in favor of the European pine was \$4.29, or 36.79 per cent.

On a shipment of Swedish pine from Lübeck to Hanover the freight rate was 80 marks (\$19.04) per 10 metric tons, while the rate on American pine was 114 marks (\$27.13), or a difference of \$8.09 in favor of the European pine, or 42.5 per cent.

On a shipment of sawn pine boards, Swedish wood, from Hamburg to Hanover, per carload of 10 metric tons, the rate paid was 65 marks (\$15.47), while on a shipment of American sawn pine boards between the same points the rate paid was 92 marks (\$21.90), or a difference in favor of the European lumber of \$6.43, or 41.56 per cent.

American oak is now classified with the species named in Special Tariff II, but American pine is still classed with the rare tropical species named in Special Tariff I and has to pay the higher rates of that tariff.

4. Fertilizers.

Fertilizers and a great variety of material for the manufacture of artificial fertilizers in the general classification of freight in carload lots of at least 10 tons are classified under Special Tariff III.

The rates as shown in the table of normal rates, given on page 12 of this report, are as follows: 2.6 pfennigs (0.619 cent) per ton-kilometer up to and including 100 kilometers (62.14 miles), and over 100 kilometers, 2.2 pfennigs (0.524 cent) per ton-kilometer, with terminal charges of 60 pfennigs (14.28 cents) per ton for distances up to and including 50 kilometers (31.07 miles); from 51 to and including 100 kilometers (31.7 to 62.14 miles), 90 pfennigs (21.42 cents), and over 100 kilometers, 120 pfennigs (28.56 cents).

In addition to the above there are many exceptional tariffs under which the bulk of the fertilizers used in Germany or exported to foreign countries is transported. The principal exceptional tariffs are as follows:

The rate for manure, gas lime, gypsum, ashes, house and street wastes, oyster and mussel shells, etc., mineral phosphates of all kinds, Thomas slag, Thomas meal, mud deposits from subsiding reservoirs, lime dust, and wool dust, is that of exceptional tariff 2, for raw materials, unless other exceptional rates apply. The rates are as follows: Up to 350 kilometers (217.5 miles), 2.2 pfennigs (0.524 cent) per ton-kilometer; over 350 kilometers, the increment is 1.4 pfennigs (0.333 cent) per ton-kilometer, with terminal charges of 70 pfennigs (16.66 cents) per ton. The regular rate for the above is that of Special Tariff III.

The exceptional rate for raw potash salts, such as bergkieserit, kainit, krugit, sylvinit, etc., potash fertilizer salts, potash magnesium salts, containing a maximum of 42 per cent of potash, and kierserit when used for fertilizing purposes or for the manufacture of artificial fertilizers, is as follows: Up to 200 kilometers (124.27 miles), 2.2 pfennigs (0.524 cent) per ton-kilometer; from 201 to 350 kilometers (124.9 to 217.5 miles) increment, 1.8 pfennigs (0.428 cent) per ton-kilometer; over 350 kilometers (217.5 miles) increment, 1 pfennig (0.238 cent) per ton-kilometer, with terminal charges in each case of 70 pfennigs (16.66 cents) per ton. Regular rate, Special Tariff III.

The exceptional rate for lime dust, marl, beet earth (rübenerde), used for fertilizing purposes or for the manufacture of artificial fertilizers, is as follows: Up to 50 kilometers (31.07 miles), 2.6 pfennigs (0.619 cent) per ton-kilometer; from 51 to 200 kilometers (31.7 to 124.3 miles), 1 pfennig (0.238 cent) per ton-kilometer; over 200 kilometers, 1.4 pfennigs (0.333 cent) per ton-kilometer for the total distance.

Regular rate, Special Tariff III: For fertilizers and raw materials named above, which are used by the German farmers for fertilizing their land or by German manufacturers for the production of artificial fertilizers, there is a reduction of 20 per cent from the above rates.

From the stations of the districts of Frankfort on the Main and Mayence to the Galician-Russian transit stations of Brody, Podwoloczyska, Nadbrzezie, and Nowosielitz, for export to Russia, the rate on the Prussian railways for fertilizers is 1.75 pfennigs (0.417 cent) per ton-kilometer, with terminal charges of 60 pfennigs (14.28 cents) per ton. Regular rates are those of Special Tariff III.

The rate on liquid manure in tank cars from Posen for distances up to 50 kilometers (31.07 miles) is from 2 to 1 pfennigs (0.476 to 0.238 cent) per ton-kilometer, with terminal charges of 60 pfennigs (14.28 cents) per ton. Regular rate, Special Tariff III.

From German and Dutch stations to Russia, excepting Poland, in the Dutch-German-Russian Association and frontier traffic, the rate per ton-kilometer over the German railways for fertilizers mentioned in exceptional rate 2B is 1.75 pfennigs (0.417 cent).

In the through traffic there are no terminal charges, as the railways receive a portion of the terminal charges collected by the Russian railways. In the frontier traffic the terminal charge is 30 pfennigs (7.14 cents) per ton.

The fertilizers mentioned above, as classified under Exceptional Tariff 2B, are as follows: Gas-lime, which has been used in the purification of gas, lime dust, sulphate of ammonia (sulphate salts of ammonia), muriate and sulphate of potassium, nitrate of sodium, Chili saltpeter, phosphate of lime, ground bone and bone dust, burnt bones, Thomas cinders, Thomas meal, moss or peat litter, phosphite and phosphor gypsum (gypsum for fertilizing purposes).

The regular rate on the above fertilizers shipped to Russia is from 2.6 to 2.2 pfennigs (0.619 to 0.524 cent) per ton-kilometer, and terminal charges from 60 pfennigs (14.28 cents) to nothing per ton.

5. *Grain.*

In the general classification of freight in carload lots of at least 10 tons, grain, including legumes, podded beans, shelled and unshelled, is classified under Special Tariff I. The rates as shown on page 12 of this report are as follows: Forty-five pfennigs (1.071 cents) per ton-kilometer for all distances, with terminal charges of 60 pfennigs (14.28 cents) per ton for distances up to and including 50 kilometers (31.07 miles); from 51 to and including 100 kilometers (31.7 to 62.14 miles), 90 pfennigs (21.42 cents), and over 100 kilometers, 120 pfennigs (28.56 cents) per ton.

When grain is used for seeding purposes it is classed under Special Tariff III. The rates are as follows: Two and six-tenth pfennigs (0.619 cent) per ton-kilometer, up to and including 100 kilometers (62.14 miles), and over 100 kilometers, 2.2 pfennigs (0.524 cent) per ton-kilometer, with same terminal charges as Special Tariff I.

There are many exceptional tariffs for grain, the most important of which are the following:

In the local and direct traffic from stations on the Prussian railways, situated 101 kilometers (62.76 miles) and more from the seaports and frontier stations, grain for export by sea to countries outside of Germany and by the frontiers to France, Belgium, Holland, Switzerland, and Austria-Hungary is transported at the following rates:

Up to 101 kilometers, the regular rate of Special Tariff I, namely, 4.5 pfennigs (1.071 cents) per ton kilometer, the increment from 101 to 400 kilometers (62.76 to 248.5 miles) is 1.43 pfennigs (0.34 cent) per ton-kilometer, and above 400 kilometers, 4.5 pfennigs (1.071 cents), with the same terminal charges as Special Tariff I.

This rate was established to permit German grain produced in the interior districts to take advantage of the favorable tariffs which were granted to grain grown in the seacoast districts and exported to foreign countries.

From East and West Prussia and Posen to Danzig, Königsberg, Memel, Neufahrwasser, and Pillau (local and export traffic) the rate is as follows:

One to 100 kilometers (0.62 to 62.14 miles), 2.6 pfennigs (0.619 cent) per ton-kilometer; 101 to 200 kilometers (62.76 to 124.27 miles), 2.4 pfennigs (0.571 cent) per ton-kilometer; 201 to 300 kilometers (124.9 to 186.4 miles), 2.3 pfennigs (0.547 cent) per ton-kilometer; 301 to 400 kilometers (187 to 248 miles), 2.2 pfennigs (0.524 cent) per ton-kilometers, with terminal charges of from 60 to 120 pfennigs (14.28 to 28.56 cents) per ton.

Over 400 kilometers the rate is the same as given above in the exceptional rate for export. Regular Rate Special Tariff I.

The rate was made for the development of the traffic in native grain to the seaports.

From the Dutch and Belgium ports to the German-Swiss frontier and adjoining stations the rate on grain is about 3.3 pfennigs (0.785 cent) per ton-kilometer, plus a terminal charge of 60 pfennigs (14.28 cents) per ton. In the traffic from Basel for West Switzerland the rate is 2.8 pfennigs (0.666 cent) per ton, with the same terminal charges as above.

The rates were made to meet the competition of the French seaports and French railways.

Between Silesian stations and Berlin and suburbs and between stations of the Berlin-Stettin line the rate on grain is from 4.3 to 3.08 pfennigs (1.02 to 0.733 cents) per ton-kilometer, with terminal charges of from 60 to 120 pfennigs (14.28 to 28.56 cents) per ton. This is an old rate which was retained to keep up the large grain traffic which had developed between the above-named stations. Regular rate is Special Tariff I.

The maximum rate on grain from the Hessian River ports and the river transfer stations, also Frankfort on the Main and Kassel to the Swiss transfer and neighboring stations, is 3.2 pfennigs (0.762 cent) per ton-kilometer, with terminal charges of 60 pfennigs (14.28 cents) per ton.

The rate on grain from Galicia to Danzig and Neufahrwasser for export to foreign countries is 3.17 pfennigs (0.754 cent) per ton-kilometer, with terminal charges of 60 pfennigs (14.28 cents) per ton.

The rate on grain shipped from the Elbe ports, Flensburg and Lübeck, to Danish stations is from 3.62 to 2.85 pfennigs (0.862 to 0.678 cent) per ton-kilometer, with terminal charges of 50 pfennigs (11.90 cents) per ton. The regular rate is from 4.5 to 3.5 pfennigs (1.071 to 0.833 cents) per ton-kilometer, plus terminal charges of 60 pfennigs (14.28 cents) per ton.

Special rates have been granted by the Prussian State Railways for the conveyance of the grain traffic from Russia to oversea countries through the German seaports, Königsberg, Danzig, etc.

The amount which the Prussian Railway receives for carrying grain from Eydtkühnen over its lines to Königsberg, about 700 kilometers (435 miles), is 4.40 marks (\$1.047) per ton. Deducting half of the terminal charge of 60 pfennigs (14.28 cents) per ton, the rate is about 2.5 pfennigs (0.595 cent) per ton-kilometer, as against 4.5 pfennigs (1.071 cents) which German grain between the same points has to pay.

In answer to a complaint that the Prussian State Railways were favoring the foreigner at the expense of the home producer, it was pointed out that the specially low rates were granted to secure the traffic to the Prussian railways, as the Russian grain need not necessarily pass over the Prussian lines, but could go via Riga, Reval, and Libau, and would have done so had the rates not been reduced.

QUESTION III.—EXPORT RATES.

To aid in the expansion of Germany's foreign trade the State railways have made specially low rates for the transportation of goods to the coast ports when intended for export to foreign countries or to the German colonies. All such merchandise, including goods transported exceptionally as fast freight (perishable goods, etc.), even when not shipped in carload lots, is taxed according to Tariff A1 for complete carloads. The rate as shown in tariff of normal rates (p. 12) is 6.7 pfennigs (1.59 cents) per ton-kilometer for all distances, with terminal charges ranging from 100 to 200 pfennigs (23.8 to 47.60 cents) per ton, according to distances, the regular rate being that for piece goods and the special tariff for certain goods shown in the tariff of normal rates (p. 12).

The above rates also apply to shipments from the Russian frontier stations of Alexandrowo and Sosnowice.

In addition to the above there are many exceptional tariffs for goods shipped in carload lots of 10 tons when intended for export. Besides the export rates already given for coal, fertilizers, grain, etc., the following are the most important:

From Dresden to the Elbe and Weser ports, as well as from Dresden and Meissen to Stettin, the rate on condensed milk for export is 4.5 pfennigs (1.071 cents) per ton-kilometer, plus terminal charges of 60 pfennigs (14.28 cents), as against the regular rate of 6 pfennigs (1.428 cents) per ton-kilometer, and the same terminal charges.

New wood boxes shipped from Habelschwerdt and Ebersdorf (district of Breslau) to the German seaports pay a rate of 1.8 pfennigs (0.428 cent) per ton-kilometer, plus terminal charges of 120 pfennigs (28.56 cents) per ton, as against the regular rate of 2.2 pfennigs (0.524 cent), with the same terminal charges. The rate was established to build up the box-making industry of the district mentioned.

COTTON GOODS.

Cotton yarn, when shipped from Alsace-Lorraine to the German seaports for export to foreign countries outside of Europe, pay a rate of 2.43 pfennigs (0.578 cent) per ton-kilometer, with terminal

charges of 60 pfennigs (14.28 cents) per ton, the regular rate being 6 pfennigs (1.428 cents) per ton-kilometer, with the same terminal charges.

From the Thuringian, Saxon, and South German stations to the German seaports there are exceptional rates on the products of the shipping districts when intended for export. The rates are given on toys, music, paper goods, bronze powder, small articles made of wood, cane, straw, leather, and metal, glass and wax beads, barometers, thermometers, etc., writing materials, lead and slate pencils, slates, slate blackboards; in other words, Thuringian, Bohemian, and Nuremberg wares. The rates are as follows: 6 pfennigs (1.428 cents) per ton-kilometer up to 100 kilometers (62.14 miles), and for distances above the increment is 3 pfennigs (0.714 cent) per ton, with terminal charges in each case of from 200 to 100 pfennigs (47.6 to 23.8 cents) per ton for 5-ton shipments, and from 120 to 60 pfennigs (28.56 to 14.28 cents) for 10-ton shipments.

To the Dutch and Belgian ports the rate is 5 pfennigs (1.19 cents) per ton-kilometer with terminal charges of 60 pfennigs (14.28 cents) per ton.

The rate on toys and bronze colors is from 5.02 to 4.49 pfennigs (1.195 to 1.069 cents) per ton-kilometer and from 4.50 to 4.49 pfennigs (1.071 to 1.069 cents) per ton-kilometer on slate blackboards when shipped from Bavaria to Holland.

In the traffic from Bavaria to Belgium and Holland through the transfer stations at Frankfort on the Main, Kastel, Gustavsburg, Mayence, Mannheim, and Ludwigshafen the rate on blackboards, etc., is 4.0 pfennigs (0.952 cent) per ton-kilometer with terminal charges of 100 pfennigs (23.8 cents) for 5-ton shipments and 4.0 pfennigs (0.952 cent) to 3.5 pfennigs (0.833 cent) for 10-ton shipments with terminal charges of 60 pfennigs (14.28 cents) per ton.

There are also exceptional export tariffs for the products of the German steel and iron industries.

The rates on iron and steel of Special Tariff I¹ when shipped from the German steel and iron districts to the German North Sea and Baltic ports (local and export traffic) and the coast districts are: From 201 kilometers (124.9 miles) upward, 3.5 to 2.8 pfennigs (0.833 to 0.666 cent) per ton-kilometer with terminal charges of 120 pfennigs (28.56 cents) per ton.

Regular rate, 4.5 pfennigs (1.071 cents) per ton-kilometer, with same terminal charges.

The rate for iron and steel of Special Tariff II¹ from 201 kilometers (124.9 miles) upward, 2.5 to 2.2 pfennigs (0.595 to 0.524 cent) per ton-kilometer with terminal charges of 120 pfennigs (2.856 cents) per ton. Regular rate 3.5 pfennigs (0.833 cent) per ton-kilometer with same terminal charges.

For iron and steel of Special Tariff II for export by sea to non-German European countries, the rate to the German North Sea and Baltic ports is 1.7 pfennigs (0.405 cent) per ton-kilometer with terminal charges of 120 pfennigs (28.56 cents) per ton. The regular rate is 3.5 pfennigs (0.833 cent) per ton-kilometer with the same terminal charges.

¹ The details of the classification of iron and steel in Special Tariffs I, II, and III, may be found on pp. 88-94 of the "Deutscher Eisenbahn-Gütertariff. Teil I. Abteilung B."

From German stations to German seaports for export by sea to other than European countries the rates are as follows: For iron and steel, iron and steel wares of Special Tariff I, brass wares, as well as other complete and half-manufactured articles made from non-precious metals and their alloys, 2.2 pfennigs (0.524 cent) per ton-kilometer, plus 120 pfennigs (28.56 cents) per ton terminal charges. Regular rate, that of Special Tariff I. For iron and steel of Special Tariff II and the following articles of Special Tariff I: Wire rivets, wire, wire strands, wire rope, wire pegs, iron and steel wire; also coppered, barbed wire, chains, screws, nails; also oven shelves and the following parts of stamping mills: Weights, levers, springs, each part to weigh less than 100 kilos (220.46 pounds); wagon axles and component parts (box axle pin, ring, etc.); railway locomotive tenders and steam wagons, railway-car bodies, railroad cars of all descriptions; iron and steel of Special Tariff III of sections 1a to d of the tariff, up to 400 kilometers (248.5 miles), 1.4 pfennigs (0.333 cent) per ton-kilometer. Over 400 kilometers, the rate calculated for the distance traveled is 1.2 pfennigs (0.286 cent) per ton with terminal charges of 60 pfennigs (14.28 cents) per ton in each case. Regular rates, those of Special Tariffs I, II, and III.

The rate on iron and steel of Special Tariffs I and II from the western foundry districts and the Saar to southwest Germany, Alsace-Lorraine, Baden, Württemberg, including the Swiss frontier and inland station, as well as to Luxemburg:

Special Tariff I, 4 pfennigs (0.952 cent) per ton-kilometer; regular rate 4.5 pfennigs (1.071 cents).

Special Tariff II, 3 pfennigs (0.714 cent) per ton-kilometer; regular rate 3.5 pfennigs (0.833 cent), with terminal charges in each case of 60 pfennigs (14.28 cents) per ton.

From Frankfort on the Main, Gustavsburg, Mayence, and Mannheim to the Swiss frontier and inland stations, the rate on iron and steel of Special Tariffs I and II is the same as above, except that the terminal charges of the exceptional rates are 30 pfennigs (7.14 cents) per ton.

Between German industrial districts and Denmark, the rates on iron and steel of Special Tariff I are:

Up to 300 kilometers (186.4 miles) 3.3 pfennigs (0.785 cent); beyond, 2.8 pfennigs (0.666 cent) per ton-kilometer, with terminal charges in each case of 60 pfennigs (14.28 cents) per ton.

For iron of Special Tariff II and pig iron the rate is 1.7 pfennigs (0.405 cent) per ton-kilometer; terminal charges 60 pfennigs (14.28 cents) per ton.

For the same products from the German foundry districts to Italy, southern France, and the Austrian coast territory, the rates are as follows:

If shipped as piece goods, 4.9 pfennigs (1.166 cents) per ton-kilometer, with terminal charges of 100 pfennigs (23.8 cents).

In 5-ton lots, 3.24 pfennigs (0.771 cent) per ton-kilometer, with terminal charges of 60 pfennigs (14.28 cents) per ton.

In 10-ton lots:

For iron of Special Tariff I, 2.23 pfennigs (0.531 cent) per ton-kilometer; terminal charges 60 pfennigs (14.28 cents) per ton.

For iron Special Tariffs II and III, 1.7 pfennigs (0.405 cent) per ton-kilometer; terminal charges same as above.

From the western foundry stations to Austria-Hungary (also via Regensburg, Deggendorf, and Passau-Donau countries) and from upper Silesia to Austria the rates on iron are as follows:

Iron of Special Tariff I, 2.8 pfennigs (0.666 cent) per ton-kilometer.

Iron of Special Tariff II, 2.2 pfennigs (0.524 cent) per ton-kilometer, with terminal charges of 60 pfennigs (14.28 cents) per ton in each case.

Regular rates 4.5 pfennigs (1.071 cents) and 3.5 pfennigs (0.833 cent) per ton-kilometer, respectively, with same terminal charges. The above exceptional rates also apply to the same products when shipped from the Saar, Lorraine, Luxemburg, and Hessian districts to Austria-Hungary, as well as to Silesia, Saxon, and Austro-Bavarian frontier stations.

From German stations to France the rates are as follows:

Iron of Special Tariff I, 4 pfennigs (0.952 cent) per ton-kilometer; iron of Special Tariff II, 3 pfennigs (0.714 cent) per ton-kilometer; iron of Special Tariff III, 2.06 pfennigs (0.490 cent) per ton-kilometer; with terminal charges of 60 pfennigs (14.28 cents) per ton in each case.

From the German industrial districts to the lower Danube countries (Roumania, Servia, Bulgaria) and beyond, as well as by the through exchange route via Regensburg, Deggendorf, Passau, Vienna, and in the redispaching traffic to the German-Austrian frontier stations, the rates on iron and steel are as follows:

Iron and steel of Special Tariff I, 2.4 to 2 pfennigs (0.571 to 0.476 cent) per ton-kilometer; iron and steel of Special Tariffs II and III, 2 to 1.7 pfennigs (0.476 to 0.405 cent) per ton-kilometer; street railway trucks, 1.23 pfennigs (0.293 cent) per ton-kilometer; with terminal charge of 60 pfennigs (14.28 cents) per ton in each case; regular rates those of Special Tariffs I, II, and III.

From German and Dutch stations to Russia (excluding Poland) in the through traffic and in the frontier traffic to the frontier stations, the rates on iron and steel are as follows:

Through traffic.—Iron and steel of Special Tariff I (10-ton shipments): Up to 612 kilometers (380.3 miles) 3.8 pfennigs (0.904 cent) per ton-kilometer. From 613 to 1,015 kilometers (380.9 to 630.7 miles) 3.5 pfennigs (0.833 cent) per ton-kilometer. From 1,016 kilometers (631.3 miles) 3.2 pfennigs (0.762 cent) per ton-kilometer, with no terminal charges.

Iron and steel of Special Tariff II (10-ton shipments): Up to 1,015 kilometers (380.9 miles) 3.5 pfennigs (0.833 cent) per ton-kilometer. Over that distance, 3.2 pfennigs (0.762 cent).

Iron and steel of Special Tariff III (10-ton shipments): Up to 100 kilometers (62.14 miles) 2.6 pfennigs (0.619 cent) per ton-kilometer. Over 100 kilometers 2.2 pfennigs (0.524 cent) per ton-kilometer, with no terminal charges in each case.

FRONTIER TRAFFIC.

Special Tariff I.—Same as above for northern Russia, except terminal charges are 30 pfennigs (7.14 cents) per ton. For middle and southern Russia, 2.7 pfennigs (0.643 cent) per ton-kilometer, with same terminal charges.

Special Tariff II.—For northern Russia, same as through traffic, except the terminal charges are 30 pfennigs (7.14 cents) per ton. For middle and southern Russia, 2.2 pfennigs (0.524 cent) per ton-kilometer, with the same terminal charges.

Special Tariff III.—For northern Russia, same as through traffic, except terminal charges are 60 pfennigs (14.28 cents) per ton. For middle and southern Russia, the rate is 1.75 pfennigs (0.417 cent) per ton-kilometer, with terminal charges of 30 pfennigs (7.14 cents) per ton.

From French and Belgian stations to Russian stations (excepting Poland), same as above, without terminal charges.

For agricultural machines and implements from German and Dutch stations to Poland in the through traffic and in frontier traffic to the frontier stations, in order to support the German competition for traffic with Poland, the same rates are charged as for the traffic to middle and southern Russia.

From the German iron industry districts to Dutch and Belgian ports, as well as for stations on the Dutch coast to Germchen and Utrecht, the rates are:

For iron of Special Tariff I, 3.5 pfennigs (0.833 cent) per ton-kilometer.

For iron of Special Tariff II (also for armor plates from Magdeburg to Amsterdam and Rotterdam), 2.2 pfennigs (0.524 cent) per ton-kilometer, with terminal charges of 60 pfennigs (14.28 cents) in each case.

Regular rates, 4.5 pfennigs (1.071 cents) and 3.5 pfennigs (0.833 cent), respectively.

From Upper Silesia to the shipping stations of the Hungarian River & Sea Shipping Co. (Ungarischen Fluss und Seeschiffahrt Gesellschaft) on the lower Danube via Pressburg the following are the rates:

Iron of Special Tariff I and agricultural machinery: Up to 100 kilometers (62.14 miles), 2.4 pfennigs (0.571 cent) per ton-kilometer; 101–200 kilometers, 2.3 pfennigs (0.547 cent).

Iron of Special Tariff II: 2 pfennigs (0.476 cent) and 1.9 pfennigs (0.452 cent), respectively, with terminal charges of 60 pfennigs (14.28 cents) per ton in each case.

Regular rates, 4.5 pfennigs (1.071 cents) and 3.5 pfennigs (0.833 cent), respectively.

Between Leipzig (Prussian railway station) and Plagwitz-Lindenau and Austro-Hungarian stations the rate on field and agricultural machinery and implements is 2.2 pfennigs (0.524 cent) per ton-kilometer, with terminal charges of 60 pfennigs (14.28 cents) per ton. Regular rate, 45 pfennigs (1.071 cents) per ton-kilometer, with same terminal charges.

In addition to the exceptional rates for export, there are many reduced rates on raw materials and other products when imported into Germany. For instance, between German, Belgian, and Dutch ports and Austro-Hungarian cities, such as Prague, Vienna, Budapest, etc., and between German seaports and the Bavarian-Danube

transfer stations, and between Denmark, Sweden, and Norway and Austria-Hungary the rates are as follows:

Coffee, cocoa, gutta-percha, pepper, nuts (excepting walnuts and hazelnuts), dyewood extracts, quebracho and other extracts, hides and skins, etc.: About 3.8 pfennigs (0.904 cent) per ton-kilometer. Regular rates, 6 pfennigs (1.428 cents) and 4.5 pfennigs (1.071 cents), respectively, with terminal charges in each case of 60 pfennigs (14.28 cents) per ton.

Fats, tallow, lard, etc.: About 3.74 pfennigs (0.890 cent) per ton-kilometer. Regular rates and terminal charges same as above.

Raw cotton, cotton waste, etc.: Up to 3 pfennigs (0.714 cent) per ton-kilometer, with terminal charges of 60 pfennigs (14.28 cents) per ton. Regular rate, 4.5 pfennigs (1.071 cents), with same terminal charges.

Between German seaports and southwestern Germany (Frankfort-on-Main and beyond), Bavaria, and Switzerland the rates are as follows:

Coffee, pepper, raw tobacco, tea, cheese, milk, gutta-percha, caoutchouc, wine, etc.: 3.68 pfennigs (0.876 cent) per ton-kilometer, with terminal charges of from 60 to 120 pfennigs (14.28 to 28.56 cents) per ton. Regular rate, 6 pfennigs (1.428 cents) per ton-kilometer, with same terminal charges.

Cotton and cotton-yarn waste: 3.09 pfennigs (0.735 cent) per ton-kilometer. Regular rate, 4.5 pfennigs (1.071 cents), with same terminal charges as above.

For many of the export and import rates there are no fixed bases; the values are made in the interests of the German sea trade, for the advancement of the German ports, and for the building up of German industries.

For coffee, coffee substitutes, hides and skins, tobacco, tallow, etc., from the North Sea ports to Westphalia there is a rate of 3.3 to 3.9 pfennigs (0.785 to 0.928 cent) per ton-kilometer, with a terminal charge of 120 pfennigs (28.56 cents) per ton, against a regular rate of 4.5 to 6 pfennigs (1.071 to 1.428 cents) per ton-kilometer, with the same terminal charges. The rates on petroleum from the German North Sea ports and Lübeck, Peine, and Salzbergen to Rheinland-Westphalia are about 2.2 pfennigs (0.524 cent) per ton-kilometer, with terminal charges of from 60 to 120 pfennigs (14.28 to 28.56 cents) per ton, as against normal rates of 6 pfennigs (1.428 cents) per ton, with the same terminal charges. This rate was made to compete with the Belgian and Dutch seaports.

The rate on refined petroleum from Russia to German stations east of the Elbe, including Dresden, Leipzig, Halle, Magdeburg, etc., is from 2.6 to 2.2 pfennigs (0.619 to 0.524 cent) per ton-kilometer, with terminal charges of 60 pfennigs (14.28 cents) per ton.

On petroleum, cleaned and raw, from Roumania to the same stations 2.2 pfennigs (0.524 cent) per ton-kilometer, and from Austria-Hungary the same as the rate from Russia given above, with terminal charges in each case of 60 pfennigs (14.28 cents) per ton.

In the following statement are shown the export rates on several classes of goods from certain cities to the principal German seaports, together with the normal rates for the same distances:

Export rates per metric ton (2,204.6 pounds) on several classes of goods on German railways, in carload lots of 10 tons.

From—	To—	Distance.		Class of goods.	Export rate.		Normal rate.	
		Kilo-meters.	Miles.		Marks.	Dol-lars.	Marks.	Dol-lars.
Cologne.....	Hamburg.....	430	267.2	Copper goods, lead in blocks: tubes.	13.20	3.14	26.80	6.38
Do.....	do.....	430	267.2	Zinc in sheets, etc.	13.30	3.17	20.40	4.86
Do.....	do.....	430	267.2	Cotton goods.....	15.30	3.64	26.80	6.38
Do.....	do.....	430	267.2	Machinery and machine parts; ironwares.	10.60	2.52	20.40	4.86
Do.....	do.....	430	267.2	Iron plates, locomotives, etc.	5.60	1.33	16.10	3.83
Frankfort.....	do.....	532	330.6	Machines and ironwares.	12.90	3.07	25.20	6.00
Do.....	Bremen.....	459	285.2	.....do.....	11.30	2.69	21.90	5.21
Do.....	Lübeck.....	577	358.5	.....do.....	13.90	3.31	27.20	6.47
Do.....	Hamburg.....	532	330.6	Iron products, such as beams, etc.	7.00	1.67	19.80	4.71
Do.....	Bremen.....	459	285.2	.....do.....	6.10	1.45	17.30	4.12
Do.....	Lübeck.....	577	358.5	.....do.....	7.50	1.79	21.40	5.09
Nuremberg.....	Hamburg.....	635	394.6	Thuringian wares, toys, etc.	24.50	5.83	39.20	9.33
Do.....	Bremen.....	583	362.3	.....do.....	22.90	5.45	36.40	8.66
Do.....	Lübeck.....	652	405.1	.....do.....	25.30	6.02	40.50	9.64

The above export and import rates are for the hauling of the goods to and from the station at the port, and an additional charge must be paid for the haulage over the dock line, which in in most cases is the property of the town. This charge varies from 1.50 marks (35.70 cents) to 3 marks (71.40 cents) per car, according to circumstances.

A large number of exceptional tariffs closely affect the trade through the ports, as one of the principal objects of the tariffs is to secure the traffic to the German railways. These rates are based as far as possible on the competitive rates through the ports of Belgium and Holland, often irrespective of the kilometric distance.

The export rates apply only to merchandise shipped through the ports for consumption in foreign countries or in the German colonies; for merchandise for native use the local rates apply.

To enjoy the benefits of the reduced rates it must be satisfactorily proved to the railway authorities that the goods in question are actually intended for export.

QUESTION IV.—EXPRESS FREIGHT.

As stated before in this report, in the classification of goods in the freight tariff, when piece goods are shipped by fast freight (eilgut) the rates charged are double those for ordinary freight, and when the merchandise is forwarded by fast freight in complete carloads it pays double the rates prescribed for complete carloads in the classes A and B.

There are also lists of specified articles which are forwarded by fast service at slow-service rates, whether the goods be consigned as piece goods or in carloads. Such articles are bees, bread, butter, fish of various descriptions, shellfish, etc., certain kinds of vegeta-

bles, milk and cream, fresh berries, stone fruit, grapes, and various plants, etc.

The fast-freight class includes all articles sent at the discretion of the railway authorities either by regular passenger or by fast-freight trains.

There is, in addition to the fast freight, a special fast-freight class, which probably corresponds more nearly to the American express service. The goods take precedence of fast-freight goods and are forwarded by the most favorable trains, specified for the purpose by the railway authorities. The rates for piece goods, including the specified articles mentioned above, are double the ordinary fast-freight class rates, and if shipped in carloads four times the rate for the slow carload classes A 1 and B.

The bases of these rates are given in the normal tariff rates, page 11 of this report. In general, it may be stated that fast freight costs twice as much and special fast freight four times as much as when shipped as ordinary freight.

The following are examples illustrative of fast freight tariffs for piece goods from Chemnitz to various points:

Place.	Distance.		Fast freight.					
	Kilo-meters.	Miles.	Transporta-tion.		Terminal charges.		Total.	
Leipzig.....	86	53	Mks.	Dols.	Mks.	Dols.	Mks.	Dols.
Halle.....	116	72	2.42	.58	.40	.10	2.82	.67
Berlin.....	220	137	4.46	1.06	.40	.10	4.86	1.16
Nürnberg.....	312	194	6.10	1.45	.40	.10	6.50	1.54
Breslau.....	351	218	6.72	1.60	.40	.10	7.12	1.69
Munich.....	464	288	8.40	2.00	.40	.10	8.80	2.09
Mannheim.....	521	324	9.16	2.18	.40	.10	9.56	2.28
Friesenhofen.....	585	364	9.92	2.36	.40	.10	10.32	2.45
Freiburg.....	696	432	11.26	2.68	.40	.10	11.66	2.78
Königsberg.....	776	482	12.22	2.91	.40	.10	12.62	3.00

Place.	Rates per 100 kilograms (220.4 pounds), special fast freight.					
	Transporta-tion.		Terminal charges.		Total.	
Leipzig.....	Mks.	Dols.	Mks.	Dols.	Mks.	Dols.
Halle.....	3.64	0.87	0.72	0.18	4.36	1.04
Berlin.....	4.84	1.15	.80	.20	5.64	1.34
Nürnberg.....	8.92	2.12	.80	.20	9.72	2.31
Breslau.....	12.20	2.90	.80	.20	13.00	3.09
Munich.....	13.44	3.20	.80	.20	14.24	3.39
Mannheim.....	16.80	4.00	.80	.20	17.60	4.19
Friesenhofen.....	18.32	4.36	.80	.20	19.12	4.55
Freiburg.....	19.84	4.72	.80	.20	20.64	4.91
Königsberg.....	22.52	5.36	.80	.20	23.32	5.55
	24.44	5.82	.80	.20	25.24	6.01

It should be noted that so far as small parcels are concerned, the great part of the express business for Germany is done through the post office, per parcels post. The weight of a package must not exceed 50 kilograms (110.2 pounds).

The rates are as follows: Up to and including 5 kilograms (11 pounds): Up to 10 miles, 25 pfennigs (5.95 cents); all distances above 10 miles, 50 pfennigs (11.90 cents). Packages weighing over 5 kilograms (11 pounds): For the first 5 kilograms as above; for each additional kilogram (1.1 pounds) or part thereof, up to 10 miles, 5 pfennigs (1.19 cents); from 10 to 20 miles, 10 pfennigs (2.38 cents); from 20 to 50 miles, 20 pfennigs (4.76 cents); from 50 to 100 miles, 30 pfennigs (7.14 cents); from 100 to 150 miles, 40 pfennigs (9.52 cents); over 150 miles, 50 pfennigs (11.90 cents).

The above rates are valid also for places in Austria-Hungary.

QUESTION V.—TYPICAL CLASSIFIED PRODUCTS.

In the following statement are given the normal and special rates charged on most of the German railways on typical products included in the various categories of the regular freight classification showing both carload and less than carload rates.

Freight rates on the German railway systems per 100 kilograms (220.46 pounds) including terminal charges.

[Not in carload lots.]

From Nuremberg to—	Dis-tance.	Fast freight.	Gen-eral freight.	Special freight.	General carload rates.			Special carload rates.		
					A1.	B.	A2.	I.	II.	III.
					1	2	3	4	5	6
<i>Miles.</i>										
Hamburg.....	394.57	\$2.60	\$1.30	\$1.26	\$1.06	\$0.94	\$0.79	\$0.71	\$0.56	\$0.36
Stettin.....	387.73	2.57	1.28	1.24	1.04	.92	.77	.70	.55	.35
Berlin.....	296.39	2.14	1.07	.96	.81	.71	.60	.54	.43	.28
Leipzig.....	200.70	1.59	.79	.66	.56	.49	.41	.37	.30	.20
Chemnitz.....	193.87	1.55	.77	.64	.55	.47	.40	.36	.29	.19
Crefeld.....	311.93	2.22	1.11	1.00	.85	.74	.63	.57	.45	.29
Frankfort on the Main.....	149.13	1.24	.62	.50	.43	.37	.31	.29	.23	.15
Strassburg.....	210.02	1.64	.82	.69	.59	.51	.43	.39	.31	.20
Stuttgart.....	118.68	1.03	.51	.41	.35	.30	.26	.23	.19	.13
Coburg.....	72.08	.67	.34	.27	.23	.20	.17	.15	.13	.09

The rates for shipments of all goods in less than carload lots are shown in columns 1, 2, 3.

Fast freight, column 1: The rates given are double those for general freight in column 2, and include terminal charges of 40 pfennigs (9.52 cents) per 100 kilograms (220.46 pounds).

General freight, column 2: The rates include terminal charges of 20 pfennigs (4.76 cents) per 100 kilograms.

Special freight, column 3: The rates are for certain articles, including bicycles, motor cycles, etc., potatoes, oil cakes, clover, etc., machinery and agricultural implements, grain of all descriptions, iron and steel of all descriptions, nails, salts, seeds, shoe blacking, earthenware, etc. Terminal charges amounting to 20 pfennigs (4.76 cents) are included in the rates.

A1, column 4: The rates are for all goods in consignments of 5 tons and include terminal charges of 20 pfennigs (4.76 cents) per 100 kilograms.

B, column 5: The rates are for 10-ton consignments and include terminal charges of 12 pfennigs (2.86 cents) per 100 kilograms.

A2, column 6: Are the rates for 5-ton consignments of such articles as are included under Classifications I and II, columns 7 and 8, and include terminal charges of 12 pfennigs (2.86 cents) per 100 kilograms.

Special Tariff I, column 7: Are the rates for shipments in 10-ton carload lots of certain articles, such as raw cotton, lead, iron and steel wares of all descriptions, field and garden fruits, grain, glass, seeds, raw sugar, etc., and include terminal charges as above.

Special Tariff II, column 8: Are the rates for shipments in 10-ton carload lots of asphalt, railway locomotives and tenders and truck bodies, flax, hemp, jute, stone, etc., and include terminal charges as above. These rates are also for 5-ton shipments of articles classified under Special Tariff III.

Special Tariff III, column 9: These are the rates for waste products, coal, fertilizers, ice, railway cars of all descriptions, chemical colors, ores, etc., and include terminal charges as above.

The above are the general rates. In addition there are many exceptional rates for shipments in carload lots, the most important of which have already been given under the various sections of this report.

QUESTION VI.—BASIS OF FREIGHT RATES.

By an inspection of the table of normal rates, page 11 of this report, it will be seen that there is a single unit for all distances for shipments of goods comprised in the special piece-good class and wagonload classes A1 to and including Special Tariff II, while for Special Tariff III there are two units for distances up to and including 100 kilometers (62.14 miles) and over 100 kilometers.

In the general class of piece goods, as well as the general and special class of fast-freight goods, the rates up to and including 500 kilometers (310.7 miles) are based on a sliding schedule, with more favorable rates for the greater distances. With varying distances, up to and including 100 kilometers (62.14 miles), the terminal charges are also based on a sliding scale. Over that distance they are uniform, according to the various classifications of goods.

Based on kilometric distances, the German railway tariff scheme would appear to possess all the elements of simplicity. Knowing the distance and the classification, all that would be necessary would be to consult the kilometric tables of rates, but the proper classification presents a certain measure of difficulty, and in many cases considerable research is required if the cheapest rate is to be found. The greatest difficulty of all, however, lies in the many exceptional tariffs that have come into existence to further the German traffic in competition with the railways and waterways of neighboring countries and to develop the German industries. In certain of these tariffs for export and import no direct bases can be given, as the rates are dictated by circumstances.

Germany is fully alive to the fact that transportation facilities are the very foundation of the industrial prosperity of any country, and appreciates the advantage of a complete and unified system of internal transport both by land and water.

Prussia has a definite policy of rendering assistance to her industries and has used her railways and waterways to this end. By the establishment of exceptional tariffs, facilities have been created for cheap through traffic, for the cheap delivery of the raw materials needed in the industries and for the cheap distribution of the native-finished products. To encourage German shipbuilding important concessions have been granted in the freight rates on raw and finished materials for ship construction and repair.

The Prussian railway administration in 1908 lowered its regular freight tariffs for 64 per cent of the traffic in order to serve the exigencies of trade—especially export trade during a period of depression.¹

By the nationalization of her railways Germany has been enabled, in a wonderfully short period, to increase the productive power of the Empire, to further its commercial interests by land and sea, to create new markets, and extend those already existing, and thus to promote the welfare of the German people.

¹ Elmer Roberts, "Monarchical Socialism in Germany," Scribner's Magazine, January, 1910.

CHAPTER II.

INLAND WATERWAYS AND CANALS IN GERMANY.

I. PUBLIC SUPERVISION.

(a) In general terms the expense for the improvement of the waterways of Germany, including original construction and maintenance, is borne by the several States, and with but few exceptions the canals and waterways are state-owned. Among the exceptions may be mentioned the following:

1. The Teltow Canal, constructed and administered by the district of Teltow.
2. The Euster Canal, joining the Havel at Brandenburg.
3. The Lehnitz Canal, connecting the upper Havel at Oranienburg with Lake Lehnitz.
4. The canalized Notte, a tributary of the upper Spree.

The three last waterways, however, are only of local importance and are owned by private companies.

Harbors of refuge for shipping during the periods of flood and ice and for passing the winter are also constructed and maintained by the States, but inland harbors of commerce with certain exceptions are usually constructed and administered by the municipalities, corporations, and other interested parties, who as a rule also own the sheds, warehouses, and plant.

The following are the principal traffic harbors belonging to the State of Prussia: The harbor of Duisburg-Ruhrort, the largest inland harbor in Germany, the harbor of Cosel on the Oder, especially constructed for the transshipment of coal and in connection with the canalization of the upper Oder, the raft harbor at Brahemünde on the Vistula, and several smaller harbors on the Oder, the Elbe, etc.

The improvement of land in Prussia by irrigation, drainage, reclamation, and the construction of dikes, when connected with unnavigable streams and rivers, is under the supervision and control of the Prussian ministry of agriculture, domains, and forests. All works, however, constructed for the purpose of improving the navigation of rivers and streams come within the province of the ministry of public works. When such works result in the reclamation of land or are used in connection with irrigation or drainage, the ministry of agriculture, domains, and forests is consulted and bears its proportionate share of the costs of the preliminary plans and of the execution of the work according to agreement in each particular case. The funds for the improvement and maintenance of waterways are in general provided for in the annual budgets or by special laws.

The head of the whole system of administration of the state-owned waterways of Prussia is the minister of public works, in whose ministry there is a special department established for the purpose. Under the minister the administration in the Provinces is in general in the hands of the provincial governors (Regierungs-Präsidenten), but for the large rivers special boards have been created, the chiefs of which are the provincial governors-general of the different Provinces, namely, for the Rhine, the Rhine board, with its head office at Coblenz; the board for the Dortmund-Ems Canal and the Ems, with its head office at Münster; the Weser River board, with its head office at Hanover; the board for the Elbe, with its head office at Magdeburg; for the Oder the Oder River board, with its head office at Breslau, and for the Vistula the Vistula board, with head office at Danzig.

In addition to the above there is a board of administration of the waterways of the Mark of Brandenburg, which include waterways lying outside of the government district of Potsdam. This board is not subordinate to the governor-general of the Province of Brandenburg, but its head is the governor in Potsdam. The waterways in the immediate neighborhood of Berlin are under the administration of the ministry of public works.

The provisional governors are assisted in the management of the waterway construction, improvement, and engineering works by technical and legal advisers.

For the local management, there are suboffices in charge of inspectors of waterways, that are responsible for the execution of the works and for the river police. Attached to the suboffices are the necessary officials, secretaries, overseers, lock, weir, and bridge keepers, etc.

The length of waterways allotted to each suboffice varies between 40 and 50 miles.

For the specially important work now in course of construction extra engineers, counselors, and architects are employed according to need. At the present time the extra officials are employed on the canal construction board at Essen, on that at Hanover, and on the principal construction board at Potsdam.

On the Rhine there is also an international commission composed of representatives of the various Rhine States, Prussia, Hessia, Baden, Bavaria, and Alsace-Lorraine.

In accordance with the law of February 25, 1907, to assist in the execution of the provision of the Prussian law of April 1, 1905, for the construction of new waterways and the improvement of those already existing, advisory councils have been appointed by the State, in which the Government and the commercial, navigation, agriculture, fishing, and other interests are represented by members or their substitutes. Not more than one-third of the members may be in the direct employment of the State. The city of Bremen, as a financial supporter of the Rhine-Weser Canal, has a right to two members.

There are six of these councils for the various sections of the works. After the new works on the canal sections from the Rhine to the Weser and to Hanover are completed, the three advisory councils which were appointed for these sections will be consolidated

into one, and when the work is completed on the other sections the advisory councils for those sections will also be consolidated into one council.

To these councils are referred:

First. The general plans for the execution of the work as set forth in the law, and the objections, if any, of participating districts (Kreise).

Second. The annual reports of the work done, mentioning the more important questions which may have arisen during the execution of the work and any objections which may have arisen.

Third. The measures for the maintenance and improvement of the navigable waterways and the promotion of traffic on the same.

Fourth. The grounds on which applications for permits to construct inland harbors of commerce have been made.

Fifth. Questions relating to tolls, freight rates, and classification of freight.

Sixth. Police traffic regulations and regulations for a uniform towing service.

Seventh. Questions regarding the welfare of workmen engaged in the construction of the waterways and in the navigation traffic.

Above the advisory councils there is a general council composed of a president and a substitute, appointed by the King of Prussia, a member from each of the six advisory councils, and a certain number of members appointed by the minister for a period of three years. In no case may more than one-third of the total membership consist of officials in the direct employment of the Government.

To the general council are referred all matters of more importance than those which would come under the supervision of the district councils. The results of the deliberations of the general council are laid before the minister of public works, who in turn submits them to the Prussian Parliament.

According to the law, the general council may be divided into two sections, one for the western and one for the eastern waterways, but up to the present time this has not been done.

(b) 1. The above-mentioned officials have neither a direct nor indirect influence upon the capitalization of navigation corporations nor upon the regulation of the freight rates. In general it is not customary for the various officials to make yearly reports; however, for statistical purposes, reports of the progress of the work under construction during the past year are published in the *Official Journal for Building Operations* (*Zeitschrift für Bauwesen*). Besides it is usual, after the completion of an important work, to publish a report in the above-mentioned journal. In this journal also are published from time to time descriptions of the less important building operations, but all of the reports are more of a private than of a public character.

According to the law of April 1, 1905, before mentioned, it is obligatory upon the King of Prussia twice in each year to read a report from the throne upon the progress which has been made in the work upon the new and improved canals and waterways. As stated before, the state builds the canals and improves the waterways and also the safety harbors. The inland harbors of commerce on the canals and rivers and terminals are with but few exceptions

constructed and maintained by the municipalities, districts, and other interested parties. The seaports and harbors are mostly the property of the state.

2. Statistics of water-borne traffic in general are collected by the imperial authorities, assisted by the officials of the various states, counties, and the navigation companies, and published by the imperial statistical bureau. This bureau publishes each year a special volume containing statistics of the water traffic, of the conditions which prevailed in the various canals and waterways at the end of each year, and the number of steamers, barges, and towing vessels registered at the end of each five years. Several of the states, especially Prussia, publish guidebooks for the German waterways.

II. WATERWAY IMPROVEMENTS.

(a) In Germany there is no established policy as to water power developed by works constructed for improving navigation. Recently, however, the value of the water power developed in the canalization of rivers and other improvements has been recognized. Reservoirs have been constructed by private corporations, where the main object was to obtain the power for electrical purposes. In the new reservoirs which are being specially erected by the state in Silesia as a protection against floods, and in the large reservoirs authorized by the law of 1905, on the Eder and Diemee for the feeding of the Rhein-Weser Canal and for improvement of the navigation on the Weser, the water power is to be utilized. Specific examples of the utilization of water power on rivers are the power plants at the new Weser weir at Hemelingen, near Bremen, and at Dörverden, county of Moya. The former is described in detail in the report of the American consul at Bremen, which is forwarded with this report. The power at the Dörverden weir is to be utilized for the generation of electricity, which is to be conducted by overhead wires to Minden to run a pumping station at that place to feed the Rhein-Weser Canal and thereby save the construction of an expensive water conduit and also for furnishing power to a private electric corporation.

Attention is called to a work prepared by the ministry of public works, called "Die Speisung des Rhein-Hannover Kanals," which contains interesting information and data regarding the utilization of water power at Dörverden.

(b) As stated before, in answer to Question I (a), river improvements, including original construction and maintenance, are undertaken by the several states, and with but few exceptions the canals and waterways are state-owned. The exceptions are noted in the answer to the said question.

In general the funds for the execution of public works are granted by the state and are covered out of the current revenue or by special loans sanctioned by law, and in certain cases in combination with contributions by provinces, districts, communities, and other interested parties.

As an example, the carrying out of the new works which are now being constructed by the Prussian Government under the provisions of the law of April 1, 1905, is made conditional on dues being levied by the State, and (1) on the Provinces and other public corporations interested, undertaking a guaranty for the cost of the administra-

tion, working and maintenance not covered by the shipping dues and other revenues on these waterways to the annual amount of \$861,346, less the supplementary maintenance of the improvements on the Dortmund-Ems Canal and the present cost of maintenance on the Freie Netze, on the Oder-Vistula waterway, and on the canalized Oder, amounting in all to \$90,583, leaving \$770,763; (2) on the State of Bremen, besides undertaking to carry out certain works on the Weser at its own expense, to contribute also one-third of the cost of the impounding reservoirs on the Weser Basin and of the regulation works below Hameln to the amount of \$1,570,000; (3) on the Provinces and public corporations interested further undertaking a guaranty for the interest at 3 per cent, and commencing with the sixteenth year for one-half per cent to the sinking fund, on about one-third of the cost of the respective sections of the works, in so far as the current revenue on the respective section of the canal after deducting the expenses of administration, working, and maintenance does not suffice to cover the amount for interest and amortization, with some alleviations as to the amount of interest during the first ten years. The amount of the annual interest guaranteed is estimated at \$735,063, and of the annual contribution to the sinking fund, starting in the sixteenth year, at \$122,500. As soon as the revenue of the respective section exceeds the amount necessary to cover the expense of administration, working and maintenance, and of interest and amortization, the surplus is to be used, first, for the further amortization of capital; secondly, for the interest and amortization on capital already expended on certain works of improvement; and, thirdly, after the amortization of capital is completed, for the reimbursement of all deficits of previous years, on administration, working, maintenance, etc., and as on interest borne by the State and by the contributory parties under their guaranty.

In other words, the Provinces and interested parties guarantee:

- (1) The cost of maintenance, working, and administration;
- (2) With certain alleviations, 3 per cent interest on about one-third of the capital; and
- (3) From the sixteenth year onward one-half per cent to the sinking fund, the State undertaking to find the money for the interest and sinking fund for the remaining two-thirds of the capital.

III. FLOATING EQUIPMENT.

(1) to (4). In the following official statistics are included all freight and passenger ships, with and without motive power, used as common carriers of goods and passengers on the German inland waterways of a capacity of 10 metric tons and over. The statistics do not include vessels employed in the government service or those used by private parties for pleasure purposes only.

On December 31, 1907, there were engaged in the inland navigation of Germany 26,235 vessels of different kinds, of a capacity of 5,914,020 tons, of which 22,923 vessels of 5,725,258 tons were without propelling power and 3,312 vessels of 188,762 tons had their own means of propulsion. Of the latter there were 1,067 passenger vessels, including 4 with electric power; 642 freight boats, including 45 with electric motors; 1,558 towing tugs, including 1 with

electric power; and 45 chain-towing vessels. There were 14,547 boats built of wood, and 11,688 of iron, steel, or other materials.

Of 26,191 vessels, 7,393 had a carrying capacity of less than 50 tons; 3,537 of from 50 to 100 tons; 1,859 of from 100 to 150 tons; 6,301 of from 150 to 250 tons; 3,122 of from 250 to 400 tons; 1,867 of from 400 to 600 tons; 899 of from 600 to 800 tons; and 1,213 of from 800 tons and over.

There were 2,571 vessels of 168,569 tons propelled by steam, with a boiler capacity of 179,582 square meters, and indicated horsepower of 479,344. In addition to the steam vessels there were 700 vessels with explosion motors, with a capacity of 6,112 horsepower. Of these, 351, with 3,345 horsepower, were for passenger service; 327, with 2,571 horsepower, for carrying freight; and 22, with 196 horsepower, for towing. There were also 50 vessels with electric propulsion, with a capacity of 347 kilowatts.

In the navigation of the inland water system the following are the general classes of barges used:

The Finow Canal boats are on an average 40.2 meters (131.9 feet) long, 4.6 meters (15.1 feet) broad, 2 meters (6.6 feet) high, and with a draft of 1.4 meters (4.6 feet), having a carrying capacity of 170 tons.

The Oder boats are on an average 55 meters (180.4 feet) long, 8 meters (26.2 feet) broad, 2 meters (6.6 feet) high, with a carrying capacity of from 400 to 500 metric tons on a draft of 1.7 meters (5.6 feet).

The Elbe boats on an average are 65 meters (213½ feet) long, 8 meters (26.2 feet) broad, 2 meters (6.6 feet) high, with carrying capacities of 300, 480, and 600 tons, with drafts of 1 meter (3.3 feet), 1.4 meters (4.6 feet), and 1.7 meters (5.6 feet), respectively.

The Rhine boats on an average are 237 feet long and 30.6 feet beam with carrying capacities of from 460 to 1,000 tons on drafts of 4, 5, 6, 7, and 7½ feet, respectively.

According to information furnished by the American consul-general at Frankfurt, in 1908 the Rhine fleet consisted of 1,318 steam vessels with indicated horsepower of 295,849 and 9,759 barges with a carrying capacity of 3,960,378 tons, or 11,077 vessels in all. Of these the German craft included 632 steam vessels with 188,690 indicated horsepower and 2,800 barges with a carrying capacity of 1,881,261 metric tons, or a total number of 3,432 vessels. Of the 9,759 barges, 6,637 with a carrying capacity of 3,443,297 tons were built of iron or steel and 3,122 with a capacity of 517,081 tons of wood. The largest vessel plying on the canalized Rhine was 85 meters (275.9 feet) long, 10.20 meters (33.5 feet) wide, with a maximum draft of 2.30 meters (7.55 feet) and maximum carrying capacity of 1,650 tons. The largest vessel which can be used on the not-canalized Main, from Offenbach to Würzburg, also to Kitzingen and Bamberg, under favorable water conditions, is about 83 meters (272.3 feet) long, 10 meters (32.80 feet) wide, with a carrying capacity of 600 tons.

(5) In general terms, canal barges built of steel or iron cost from 50 to 55 marks (\$11.90 to \$13.09) per ton carrying capacity; built of oak, 40 marks (\$9.52); and of pine, 30 marks (\$7.14).

Modern built paddle-wheel steamers cost from 250 to 350 marks (\$59.50 to \$83.30) per indicated horsepower and screw steamers from 200 to 260 marks (\$47.60 to \$61.88).

On the Elbe, Havel, and Spree the cost of paddle-wheel steamers ranges from 80,000 to 300,000 marks (\$19,040 to \$71,400) and screw steamers from 40,000 to 100,000 marks (\$9,520 to \$23,800).

On the Rhine, paddle-wheel steamers range in cost from 100,000 to 500,000 marks (\$23,800 to \$119,000) and screw steamers from 80,000 to 200,000 marks (\$19,040 to \$47,600).

Stern-wheel steamers on the canals cost from 100,000 to 200,000 marks (\$23,800 to \$47,600).

(6) Boats for carrying lumber and iron of long dimensions are constructed without bulkheads.

There are also iron tank barges of from 1,200 to 1,300 tons for carrying coal oil, which go to Magdeburg and Dresden and have special quays, where they are filled and emptied by means of pumps.

Some barges are specially fitted for carrying acids.

At the instance of the Bohemian and South German breweries, the Elbe shipping companies have had special barges built for the transportation of beer. These vessels are provided with ice machines and cold-storage rooms, by means of which the temperature can be regulated. The advantages thus provided over transportation by rail are the following: A quiet carriage without any shaking, such as is impossible on the railroads. An even temperature, which is necessary if the beer is to retain its excellence, and saving of freight.

Worthy of mention, further, are the barges which are used to transport fruit to Berlin from Bohemia. These are built of good wood in that country and are sent with a full cargo to Berlin, where their destiny is fulfilled, as they are then taken apart and the wood sold for building purposes. The amount thus realized covers at least the costs of material.¹

The "Ziegel Transport A. G.," a German company for the transportation of bricks, operates barges built especially for the purpose, with electric motor power.

On the open rivers, as a general rule, the size of fleets of barges is unlimited; for instance, on the Elbe downward there are sometimes from 10 to 12 barges in one tow. In the canalized rivers and canals, however, the size and number of towed barges are limited by the police regulations governing the various canals and improved waterways. As example, the following are the regulations for tows of barges in the waterways under the supervision of the governor at Potsdam. The barges must not be over 5 meters (16.4 feet) apart.

(1) On the Havel: (a) On the Havel and in the Voss Canal from the Dammhaft bridge, in Zehdenick to the Finow Canal, 2 barges. (b) From the junction with the Spree, to and including Pichelsdorfer junctions, upstream 6 barges, downstream 3 barges. (c) From the Pichelsdorfer Junction to the Elbe, 6 barges, with the exception that in the canal in the city of Brandenburg only 4 barges are permitted in tows coming upstream and single barges in tows coming downstream.

(2) On the stretch between Sakrow and Paretz, 6 barges.

(3) On the Hohensaaten-Spandauer stretch: (a) From the Hohensaaten Locks up to and including Leipersee, 6 barges. (b) From Leipersee to the Pinnower Locks, 2 barges. (c) From Pinnower Lock to Spandau, 6 barges.

(4) On the Spree: (a) From Trebatch to Fluthkrug, 1 barge. (b) From and including Lake Dameritz to the upper limits of Berlin, 4 barges. (c) From the Charlottenburg railroad bridge to the Charlottenburg Locks, upstream, 3 barges; downstream, 2 barges. (d) From the Charlottenburg Locks to the junction with the Havel, upstream, 6 barges; downstream, 2 barges.

¹ Report of the American vice consul at Magdeburg, p. 90.

(5) On the Oder-Spree Canal and the stretches of the Friedrich Wilhelm Canal, which join the above canal, 4 barges, with the exception that in the canalized Spree, from Kersdorfer Locks to Grosse Traenke Lock, downstream, only 2 barges are permitted. On the stretches of the Friedrich Wilhelm Canal, which have not been widened, only 1 barge is permissible.

(6) On the Dahme, from the village of Bindoro to its junctions with the Spree, 4 barges.

(7) On the waterways of the Oranienburger Havel, Kuppiner Canal and the Rhin, from Zippelsforde to and including Lake Kremmin, 2 barges. On the Linumer Rhin and Fehrbellin Canal, 1 barge.

(8) On the old Oder from the Wriezen Dam Bridge to the Hohensaaten-Spandau Waterway, 2 barges.

(9) On Lake Beetz, 6 barges.

(10) On the Storkow Canal, 2 barges.

(8) Barges are constructed with the greatest possible bearing surface, so as to insure a large carrying capacity at low stages of the water in the canals and rivers, but the dimensions of the vessels are in many cases limited by the size of the locks in the canals. The barges are built as low as possible to enable them to pass under the bridges during high water. In many cases barges when loaded to their full capacity have a freeboard of only 6 or 8 inches.

IV. OWNERSHIP OF VESSELS.

(a) With the exception of the government steamers, barges, dredging machines, ice breakers, etc., for keeping the channels in good condition, the vessels on the inland waterways of Germany are all privately owned and belong either to single individuals or to shipping corporations.

The tugs are in part owned by these individuals or companies, or chartered from special firms and societies. In the Elbe-Trave Canal, however, towing is carried on by the Free City of Lübeck, under a special tariff, and on the Teltow Canal the towage service is a monopoly of the county of Teltow, which owns the canal.

On the upper Main, the tugs for sunken chain towage are owned by the State of Bavaria.

(b) It is the tendency in Germany at the present time to unite the ownership of fleets of barges and tugs in the hands of corporations and syndicates, so that on the larger waterways the smaller boat owners are subjected to severe competition.

For details regarding the principal companies and syndicates which operate and control the bulk of the traffic on the inland waterways on the Elbe, Spree, Havel, and Oder, I would refer to the reports of the consular officers at Hamburg and Magdeburg, which are submitted as annexes to this report.

The Rhine traffic, as on the other waterways of Germany, is carried on by corporations and by private individuals. The more important companies and shipping firms are the following:

Cöln-Düsseldorfer Dampfschiffahrts Gesellschaft, with 30 passenger steamers.
Rheinischer-Lloyd, with 23 freight steamers.

Rhein und See Schiffahrts-Gesellschaft, with 28 steamers and 49 barges.
Mannheimer Lagerhaus Gesellschaft, with 15 steamers and 38 barges.

Mannheimer Dampfschleppschiff Ges., with 13 steamers and 71 barges.

“Badische Aktien Gesellschaft für Rheinschiffahrt,” with 12 steamers and 69 barges.

Math. Stinnes, with 22 steamers and 84 barges.

Franz Hamer & Co., with 14 steamers and 56 barges.

Rheinschiffahrt vorm. Fendel, with 23 steamers and 74 barges.

Frankfurter, A. C., für Rhein-Main Schiffahrt, with 4 steamers and 42 barges.

In addition to the above a number of small barge owners have formed an association for the protection of their interests and to enable them to compete with the larger companies.

(c) Merchant vessels are not owned by the State nor by private railroads. There are a few producing and distributing concerns, such as the German branch of the Standard Oil Company, the Saccharin Fabrik at Westerhausen, various associations of coal dealers, etc., which have their own barges, but the tonnage of vessels operated by these concerns is very small when compared with the total tonnage of the vessels engaged in the inland water traffic of Germany.

(d) There are no fleets of merchant vessels owned and operated by public authorities in Germany.

(e) As stated above, towage of vessels in the Elbe-Trave Canal is carried on by the Free City of Lübeck, and in the Teltow Canal by the canal authorities. As a general rule, however, the towage service is in the hands of powerful syndicates and corporations, but there are associations of individual barge owners which compete successfully against the larger companies.

For details regarding the different syndicates and associations, I would refer to the reports of consular officers submitted with this report.

V. TERMINAL FACILITIES.

(a) In the waterway system of Germany there are terminals at the principal points for loading, unloading, and storing freight. The most important are those at Königsberg on the Pregel, Breslau and Kosel on the Oder, Hamburg on the Elbe, Berlin on the Spree-Havel, Magdeburg on the Elbe, Minden on the Weser, Duisburg-Ruhrort on the Rhine, Cologne on the Rhine, Frankfort on the Main, Mannheim on the Rhine, Dortmund on the Dortmund-Ems Canal.

The principal harbors of the German Rhine from Strassburg down are shown in the following statement:

German Rhine ports.

Name.	Administration.	Loading space.	Cranes.	
			Number.	Capacity.
Strassburg.....	Municipal.....	Miles.....		Tons.....
Kehl.....	State.....	5.8	31	4
Karlsruhe.....	Municipal.....	6.4	10	8
Rheinau.....	State.....	2.8	15	.....
Mannheim.....	do.....	7.5	24	8
Ludwigshafen.....	do.....	12.1	109	30
Worms.....	Municipal.....	3.4	57	10
Gustavsburg.....	State.....	2.4	7	5
Mayence.....	Municipal.....	1.7	27	12
Bingen.....	do.....	4.0	16	5
Coblenz.....	State.....	.9	5	7
Cologne.....	Municipal.....	.7	4	9
Mülheim on the Rhine.....	do.....	5.2	45	30
Düsseldorf.....	do.....	.62	10	6
Duisburg-Ruhrort.....	State.....	6.2	36	25
Emmerich.....	do.....	12.7	84	30
On the Main:				
Frankfort.....	Municipal.....	1.9	10	5
Offenbach.....	do.....	3.2	38	8
				10

For terminal facilities for unloading, storing, and transferring goods brought by water, Berlin is far behind other cities of inferior importance. The best harbors are the Humboldt Hafen and the city-owned harbor Urban Hafen. A new harbor has been built near Spandau, one of the suburbs of Berlin, and the new harbor at Stralau is nearly finished. There are no striking physical features of these terminals.

On one of the harbors of the Teltow Canal there was recently opened a large warehouse which covers practically three-quarters of an acre. It has five floors available for storage purposes. It is constructed entirely of iron and concrete, and is in direct communication with the State Railways and canal, so that merchandise can be readily and cheaply transferred from one to the other. The power station belonging to the canal authorities furnishes the electricity for working the hoisting and unloading machinery and for the electric lighting.

On the free rivers, and more especially on the canalized rivers and canals, long lines of embankments are fitted out as wharves and supplied with loading, storing, and unloading appliances, and many of the more important places have railway connections, thus forming the means of transshipping from water to rail and vice versa. This accounts for the comparatively small number of special harbors on the extensive network of Mark waterways on which, for instance, in Berlin and the suburbs, the banks of the Spree and of the canals are lined with wharves.

The most important terminal harbor in Prussia is that at Duisburg-Ruhrort, on the Rhine. In this harbor there are modern facilities for loading and unloading the boats; also for conveying the merchandise to and from the freight cars of the railway system. For a description of this and the other important ports I would refer to the report of the American Consul at Barmen and to those of the consular officers in whose districts the ports are located.

(b) The utility of the waterways has been greatly increased and the cost of transport by water diminished by shortening as much as possible the time necessary for loading and unloading the boats. Some of the new harbors—for instance at Duisburg-Ruhrort, Mannheim, Magdeburg, Kosel, and others—have been equipped with very complete arrangements for this purpose, consisting of coal chutes and tipplers, hydraulic, steam, and electric cranes, depots served by elevated lines of rails, fixed and movable grain elevators, granaries and sheds, and all arrangements for handling goods in bulk in the most rapid and cheap manner possible. For details regarding these facilities, I would refer to the reports of the consular officers submitted with this report.

(c) In the modern inland harbors of Germany railroad tracks are located in the terminals, permitting direct transfer between railroad and water lines, and the older harbors are being improved as far as possible to enjoy the same advantages. As stated above, in Berlin, although there is a belt railroad, the railway connection between the rail and water lines is defective. But few of the waterways of the city with the harbors and terminals are connected with the State Railway System.

In the Report on the Waterways of Germany, by W. H. Lindley, Volume VI of the Report of the Royal Commission on Canals and

Waterways, on pages 192 to 196 there is a table (G-7) in which is given interesting data regarding the inland harbors of Germany on the more important and on some branch waterways. A summary of the table given on page 67 of the report shows that of the inland harbors described 122 were connected with the railways and 191 were without railway connection.

(d) Mr. Lindley's report contains a vast amount of valuable and useful information regarding the waterways of Germany which will be of great interest to a student of the question.

The inland harbors of Germany, whether belonging to the State, to the municipalities, or to other corporations, are mostly public harbors; that is, anyone can use them. The terminals are not owned at all by private railways.

VI. TOLLS AND FREIGHT RATES.

(a) Tolls are collected on canals and on certain improved rivers, for instance, the Oder from Kosel to Breslau, on the improved Saale, on the lower Weser from Bremen to Bremerhaven, on the Oder from Stettin to Swinemünde, and on the canalized Main from Gustavsburg to Frankfort.

At present there is a bill in the Prussian Parliament for the imposition of navigation dues, which has raised a storm of protest throughout the country. The question of levying tolls on navigable rivers in Germany dates back for several years, since Prussia launched her project of the general improvement of her waterways. To meet the heavy expenses necessary to carry out the policy, it is proposed to raise the required amount by the imposition of navigation dues. To do this there are two kinds of obstacles to overcome—constitutional and natural. According to article 54, section 4, of the imperial constitution, upon all natural waterways tolls may only be levied for the use of special accommodations, such as cranes, harbor facilities, docks, etc., that are made in the interest of traffic. Those dues, as well as those for the use of the state-owned canalized rivers and canals, may not exceed the amount necessary for covering the costs of construction, their maintenance, and working expenses, and may not be levied for the purposes of revenue. Therefore to pass a bill to levy tolls on the natural rivers makes it necessary to change the constitution. Prussia and Bavaria are in favor of the measure, as both are mutually interested in improvement of the Rhine and Danube, but Hesse-Darmstadt, Saxony, and Baden are strongly opposed.

Finally, but reluctantly, the Governments of the three latter States have consented to the principle set forth in the bill. The details of the measure are not known, only with the exception of one point, that Prussia and Bavaria have agreed to apply a sliding scale of tolls, so that the heavier burden is placed on the larger States. In what shape the bill will finally leave the Reichstag is very difficult to predict.

As to the international side of the question it will be necessary for the Imperial Government to enter into diplomatic negotiations with Austria, France, and the Netherlands. In a series of international treaties, dating from the Vienna congress of 1815 to the Berlin treaty of 1878, the several German States in question, which form a part

of the German Empire, and the three powers just mentioned have adopted the same principle which is contained in the German constitution. Austria, France, and the Netherlands must give their consent to the levying of tolls—Austria for the Danube and the Elbe, France for the Moselle, and the Netherlands for the Rhine. As far as France is concerned nothing is known of her position, but Austria already in no uncertain way has announced the strongest opposition and it is at least questionable whether or not she will agree. The Netherlands holds a similar position. Therefore it is clear that the carrying out of the new policy of levying tolls on natural waterways will be attended with much difficulty. It is said that the negotiations made necessary by the treaties mentioned above will not be entered into by the German Government before the bill for the change in the German constitution has passed Parliament.

Tolls are usually charged per ton and kilometer on loaded barges. On the Main, canalized from the Rhine to Frankfort, the tolls are levied on barges loaded with more than 200 tons of freight. Empty barges, barges loaded with less than 200 tons of freight, barges passing from the Rhine to the free uncanalized Main above Frankfort and vice versa, and goods that are transshipped on the canalized Main at Offenbach—that is, those which leave Offenbach Harbor on the waterway or on the railway—are free.

On the Dortmund-Ems Canal the dues are levied on loaded barges per ton-kilometer, but for empty barges with tugs there is a reduced rate. Tugs towing boats are free.

On the Mark waterways both empty boats and tugs without boats are subjected to reduced tolls. The same conditions prevail in the Elbe-Trave Canal. On the Teltow Canal in the local traffic goods received pay double the tolls of goods dispatched.

(b) The rates for towing, with the exception of the State-owned canals and the Teltow Canal, are established by the navigation companies, those for the Rhine by the shippers exchange at Duisburg, and depend upon the number of barges to be towed, upon the condition of the water, whether up or down stream, upon the distance, etc. The towing charges on the Rhine are influenced by the fact that the goods are carried up in fleets of large boats and that the strong current in the stretch between Ruhrtort and Mannheim requires powerful tugs. The towing charges by steam tugboats are affected in those waterways where towing by horses is possible by the competition met with in the animal traction. With the above-mentioned exceptions there are no special tariffs, as the rates frequently change from day to day.

Under ordinary conditions of business and with the river (Elbe) at a normal height it costs \$214.20 to tow a barge carrying 20,000 centners (2,200,000 pounds) from Hamburg to Magdeburg, a distance of 186 miles, or 0.952 to 1.1 cents per 110 pounds, but unfavorable conditions often double this rate. The navigation companies tow their own empty barges down the river in order to use them again as soon as possible, whereas under ordinary conditions they are allowed to drift with the current.¹

For the towing rates on the Main, which are charged separately for vessels and cargo, I would refer to the report from the American

¹ Report from American consulate at Magdeburg, p. 94.

consulate general at Munich; for other towing charges I would refer to the reports of the consular officers submitted as annexes to this report.

One of the provisions of the law of April 1, 1905, for the improvement of Prussian waterways provides for a uniform State monopoly for towage on the canal from the Rhine to the Weser, the branch to Hannover, on the Lippe, and on the branch canals of these waterways; to forbid mechanical towage to others than the State using these canals and that boats traveling under their own power should need special permission.

(c) Generally speaking, there are no fixed rates for water transportation, as they vary from day to day, depending upon the size of shipment, the state of water in the canals and rivers, and upon the activity of trade.

Freight rates on the Elbe have fluctuated from 14 to 42 pfennigs (\$0.033 to \$0.099) within one month. Much depends, as respects that particular river, upon the demand for tonnage for return cargo, as the Elbe is a river upon which freight is carried both ways, while on the Rhine freight is chiefly carried in one direction. Thus it may happen that there is an excessive demand for tonnage for freight from Hamburg to the interior and an absence of cargo for the return trip. At other times precisely the opposite situation may exist, and at still other times the demands for tonnage in both directions may about balance. Offers for transportation are made upon the Hamburg Bourse every day, just as stocks and bonds and merchandise are offered for sale; and while the existence of large combinations of freight carriers tends to steady rates, the changes nevertheless are frequent and rapid.¹

Lower than the prevailing rates may be obtained from private owners of barges (Wilde Schiffer) who are not in the syndicate, but the tonnage traffic of these boats is small compared with the total tonnage of the inland navigation of Germany.

The freight rates are usually calculated according to classes. On the Elbe the classification is as follows: First class: Coal, salt, ore, stone, and other heavy goods in bulk. Second class: Grain, oils, sugar, etc. Third class: Ordinary piece goods. Fourth class: Piece goods which require more careful handling, such as machines, etc.

(d) The rates increase slowly with the distance of the haul, but the increase is very moderate as long as the water is fairly high so that the vessels can travel with full cargoes, thus preventing a scarcity of barges. There are special steamers—Eilgutdampfer—for goods requiring speedy transportation. The fluctuation in freight rates is not so great on the canals and rivers east of the Elbe as far as the Oder. The following examples will illustrate these fluctuations: August 12, 1909, when the water was fairly low, the following rates were paid for freight, the barges being fully loaded:

From Hamburg to—	Cents.
Magdeburg (186 miles)-----	per 220 pounds 4.2 to 4.5
Schönebeck (195 miles)-----	do 5.0 to 4.8
Aken (214 miles)-----	do 5.5 to 5.2
Torgau (295 miles)-----	do 6.9
Dresden (357 miles)-----	do 8.8
Berlin (through the canal; 186 miles)-----	do 6.6 to 6.1
Halle (up the Saale; 258 miles)-----	do 8.5

With similar conditions as regards the height of the river prevailing, but with greater quantity of goods to be transported on barges which, on account

¹ Report of consul general at Hamburg, p. 79.

of the comparatively low water, could not carry their full tonnage, the rates September 25, 1909, were as follows:

From Hamburg to—	Cents.
Magdeburg	per 220 pounds 6.6
Schönebeck	do 7.1
Aken	do 7.3
Torgau	do 12.3
Dresden	do 13.5
Berlin	do 9.0
Halle	do 13.0

With less favorable water conditions the cargoes of the barges had to be considerably reduced, and a plentiful supply of goods to be shipped, the freight rates November 9, 1909, were as follows:

From Hamburg to—	Cents.
Magdeburg	per 200 pounds 9.5
Schönebeck	do 10.0
Aken	do 10.2
Torgau	do 13.8
Dresden	do 17.1

From Magdeburg to Hamburg the barges are floated down the river, thus there are no charges for towing. The following rates prevailed during the last few months: August 12, 1909, 2.8 cents per 220 pounds; September 25, 1909, 3.1 cents per 220 pounds; November 6, 1909, 3.3 cents per 220 pounds. From Aussig to Magdeburg (248 miles), August 12, 2.8 cents; September 25, 2.8 cents; November 6, 3.4 cents. From Aussig to Hamburg (434 miles), August 12, 3.3 cents; September 25, 3.5 cents; November 6, 4.3 cents.

The above figures are for goods in bulk of Class I. For piece goods the fluctuations are not so great, the rate for fast freight from Magdeburg to Hamburg being between 14.3 and 16.6 cents per 220 pounds, and from Magdeburg to Lübeck 16.6 to 19 cents for the same quantity. The same rates apply from Hamburg and Lübeck to Magdeburg. It is further to be remarked that the figures given are the rates for carriage alone and do not include fees for trans-shipping, etc.¹

(e) With the exception of shipments of grain up the Danube into Bavaria, and all classes of merchandise from Germany via Hamburg to the Levant and to the East Coast of Africa, no prorating arrangements exist between water lines and railroads. As regards the grain shipments mentioned above, the grain comes as far as Vienna or Passau by water on the vessels of the Erste K. K. Priv. Oesterreich. Donau Dampfschiffahrts-Gesellschaft, and then by the state railways to the various destinations. Copies of the joint rail and water tariff of this company are given in the report of the American consul at Nuremberg, which is submitted as an annex to this report.

The Deutsche Levante and the Deutsche-Ost-Afrika tariffs are well-known tariffs and they form a system of published through rates from the principal towns of Germany, through Hamburg, to the Levant by the steamers of the Deutsche Levante Line, and through Bremen by the Atlas Line, and to certain places in East Africa through Hamburg by the steamers of the Deutsche Ost-Afrika Linie. As to the varying proportions between ship and rail, these are not ascertainable, but in general the effect of the through rates is to institute competition with the Austrian rail rate through Trieste.

(f) In general the railroad freight rates to water competitive points are not higher than to interior nonwater points. It occurs occasionally that for economic reasons the freight rates are lowered, to give inland manufacturers an opportunity to ship their goods

¹ Report of vice consul at Magdeburg, p. 94.

by rail, when their plants are not located on a waterway, so as to compete with the goods of those manufacturers whose works have a water connection. This, for instance, was the main reason for granting an exceptional tariff on sugar for export in favor of refineries located at some distance from the rivers or canals. The basis of this rate is from 1 to 100 kilometers (0.62 to 62 miles), 2.6 pfennigs (0.619 cent) per ton-kilometer; over 100 kilometers, 2.2 pfennigs (0.524 cent) per ton-kilometer, with terminal charges of 60 pfennigs (14.28 cents) per ton, from 1 to 50 kilometers (0.62 to 31 miles), 90 pfennigs (21.42 cents) from 51 to and including 100 kilometers (31.7 to 62 miles); above 100 kilometers, 120 pfennigs (28.56 cents) per ton. The regular rate is 4.5 pfennigs (1.07 cents) per ton-kilometer, with the same terminal charges as above.

It is difficult to make a strict comparison between water rates and paralleling railroad rates, as there are no fixed rates for water transportation, as they vary from day to day, depending upon the size of the shipment, the state of water in the canals and rivers, and upon the activity of the trade. From the report of this consulate-general on "Transportation rates by rail and water in the consular district of Berlin," dated April 6, 1909, I give the following data: The railroad rates designated by *A* are the actual rates for goods intended for export. The water rates via regular steam barge companies designated *B*, and the water rates via private barges designated *C* are the same as given, whether the goods are for export or for consumption in Germany:

	Under 5 tons.	Per ton per mile.	5 to 10 tons.	Per ton per mile.	10 tons and over.	Per ton per mile.	50 tons.	Per ton per mile.
Cement:								
A.....	\$4.95	2.8	\$2.62	1.5	\$1.76	1.01	.....	.....
B.....	1.07	.45	.95	.4	.95	.4	.....	.....
C.....							\$0.52-0.60	0.21-0.25
Grain:								
A.....	4.95	2.8	3.62	2.07	1.97	1.13	.....	.....
B.....	1.43	.6	1.31	.55	1.19	.5	.....	.3
C.....							.60-.71	.25-..
Iron:								
A.....	4.95	2.8	2.14	1.23	1.07	.61	.....	.....
B.....	1.43	.6	1.43	.6	1.19	.5	.....	.....
C.....							.60-.71	.25-.3
Flour:								
A.....	4.95	2.8	3.62	2.07	1.97	1.13	.....	.....
B.....	1.31	.55	1.19	.50	1.19	.5	.....	.....
C.....							.60-.71	.25-.3
Oil and fats:								
A.....	4.95	2.8	4.95	2.8	4.28	2.46	.....	.....
B.....	1.19	.5	1.19	.5	1.19	.5	.....	.....
C.....							.60-.71	.25-.3
Sand:								
A.....	4.95	2.8	2.62	1.5	1.64	.94	.....	.....
B.....	1.19	.5	1.19	.5	1.19	.5	.....	.....
C.....							.52-.60	.21-.25
Coal:								
A.....	4.95	2.8	2.62	1.5	1.64	.94	.....	.....
B.....	1.19	.5	1.07	.45	.95	.45	.....	.....
C.....							.48-.60	.2-.25
Terra-cotta pipes, etc.:								
A.....	4.95	2.8	2.62	1.5	1.76	1.01	.....	.....
B.....	1.90	.8	1.79	.75	1.67	.7	.....	.....
C.....							.71-.95	.3-.4

^a These rates are for merchandise exported to countries outside of Europe; for goods exported to European countries the rates are for 5 to 10 tons lots \$2.80, or per ton per mile 1.6 cents: for 10 tons lots and over \$1.40, or per ton per mile 0.8 cents.

The following are the rates by rail and water between Berlin and Stettin:

[Distance by rail, 84 miles; distance by water, 117 miles.]

	Under 5 tons.	Per ton per mile.	5 to 10 tons.	Per ton per mile.	10 tons and over.	Per ton per mile.	50 tons.	Per ton per mile.
Cement:		<i>Cents.</i>		<i>Cents.</i>		<i>Cents.</i>		<i>Cents.</i>
A.....	\$2.62	3.11	\$1.40	1.67	\$1.00	1.19	.....	.....
B.....	1.19	1.01	.95	.81	.95	.81	.....	.....
C.....							\$0.46-\$0.57	0.41-0.49
Grain:								
A.....	2.62	3.11	1.90	2.26	1.47	1.75	.....	.....
B.....	1.67	1.42	1.43	1.22	1.19	1.01	.....	.....
C.....							.57- .67	.49- .57
Iron:								
A.....	2.62	1 3.11	1 1.19	1 1.41	1 595	.71	.....	.....
B.....	1.43	1 1.22	1 1.19	1 1.01	1 1.07	.91	.....	.....
C.....							.52- .595	.45- .51
Flour:								
A.....	2.62	3.11	1.90	2.26	1.47	1.75	.....	.....
B.....	1.43	1.22	1.19	1.01	1.19	1.01	.....	.....
C.....							.57- .67	.49- .57
Oils and fats:								
A.....	2.62	3.11	2.62	3.11	2.21	2.63	.....	.....
B.....	1.43	1.22	1.19	1.01	1.19	1.01	.....	.....
C.....							.52- .595	.45- .51
Sand:								
A.....	2.62	3.11	1.40	1.67	.86	1.05	.....	.....
B.....	1.43	1.22	1.07	.91	.95	.81	.....	.....
C.....							.48- .57	.41- .49
Coal:								
A.....	2.62	3.11	1.40	1.67	.88	1.05	.....	.....
B.....	1.43	1.01	.95	.81	.95	.81	.....	.....
C.....							.48- .57	.41- .49
Terra cotta:								
A.....	2.62	3.11	1.40	1.67	1.00	1.19	.....	.....
B.....	1.67	1.42	1.31	1.12	1.07	.91	.....	.....
C.....							.595- .76	.51- .65

^a These rates are for merchandise exported to countries outside of Europe; for goods intended for European countries the rates are for 5 to 10 tons lots \$1.67, or per ton per mile 1.98 cents; for lots of 10 tons and over \$0.83, or per ton per mile 0.99 cents.

According to Peters "Schiffahrts Abgaben," volume 115, Schriften des Vereins für Sozialpolitik, page 165 et seq., the average water freight per ton for grain from Hamburg to Berlin from 1900 to 1905 was \$0.65, or .36 cent per ton per mile, and the average railroad rate \$3, or 1.7 cents per ton per mile.

The same authority states that the average rates per ton for sugar from Breslau to Hamburg, passing through Berlin, were as follows from 1897 to 1906: Export sugar, \$3.47, or .916 cent per ton per mile; rail, home consumption, \$6.81, or 1.8 cents per ton per mile; water, home consumption, \$1.35, or .27 cent per ton per mile. Distance by rail, 610 kilometers (379 miles); distance by water, 799 kilometers (496 miles).

While there is active competition between the German railroads and waterways the relations are friendly. The exceptional railroad tariffs fully described in Chapter I of this report for goods intended for export were made not only to foster the German industries, but to meet the competition of the waterways leading out of the Empire or of alternative waterway routes through other countries or States.

Some four or five years ago the water was so low in the Oder that the coal-laden barges could not come from Posen to Berlin with their cargoes. The vessels were for months stranded in the river

without being able to proceed. The Prussian minister of public works, the head of the railway administration, issued instructions permitting the coal to be hauled to the nearest railway station and shipped by rail to Berlin at specially cheap rates of freight.

During the close of the regular water traffic between Stettin and Swinemünde on account of ice special reduced rates of freight are granted to shipments by rail. The distance is calculated at 80 kilometers (49.7 miles), instead of the actual distance, 112 kilometers (69.6 miles).

The difference between the special and the regular rates, for instance, for express goods is as follows: Regular rate, 2.74 marks (65.2 cents) per 100 kilograms (220.46 pounds); special rate, 2.10 marks (50 cents); for piece goods, regular rate, 1.37 marks (32.6 cents); special rate, 1.05 marks (25 cents).

For goods of Special Tariff II in carload lots of at least 10 tons: Regular rate, 0.51 marks (12.1 cents); special rate, 0.37 marks (8.8 cents). Goods included in Special Tariff II are railway locomotives and tenders, flax, hemp, certain kinds of wood, jute, stone, etc.

It may be stated that the exceptional rates of the Prussian railways for agricultural and other products are so low that when the river conditions are unfavorable they are no higher than the rates for water transportation, and in some cases even less.

Prussia is expending vast sums annually in improving and developing her waterways and thus virtually helping the competitors of her railway systems. The policy, however, is a farsighted one, as land is reclaimed by drainage, fields are protected against floods and rendered fertile by irrigation, enhancing their taxable value, and thus increasing the revenues from taxation. The industries are encouraged by enabling industrial plants to be erected on what otherwise would be unavailable sites, with cheap water transport for raw materials and good rail connection for the distribution of the finished products, thus increasing the traffic on the railways. The welfare of the people as a whole is fostered and the vitality of the nation improved.

There is no legislation regulating the relations between rail and inland waterway systems of transportation; neither is there any governmental restriction on the lowering of freight rates in competition with water rates.

With the exception of merchandise of low value, goods when shipped on the waterways are usually insured by the consignor or by the navigation company when requested. Large firms which ship regularly by water have open policies issued by the various insurance companies. The average rate of insurance is 1 mark (\$0.238) per 1,000 marks (\$238).

The insurance does not affect the freight rates.

VII. WATER-BORNE TRAFFIC.

The bulk of the water-borne traffic of Germany consists of coal, ores, agricultural products, and wood. Berlin is the center and mart of a labyrinth of canals and canalized watercourses. The following statement of the water traffic of this city and Charlottenburg for

the past three years will indicate the general character of the commodities carried:

Water traffic in Berlin and Charlottenburg for the past three years, in metric tons.

[Not including goods in transit.]

Description.	Imports.			Exports.		
	1906.	1907.	1908.	1906.	1907.	1908.
Bricks, cement, lime, sand, stone, etc.	6,502,796	4,617,286	4,003,850	208,040	303,628	294,314
Wood	439,133	343,120	311,589	20,931	14,455	11,107
Coal	1,452,576	1,522,975	1,616,629	36,958	19,984	18,283
Raw material	407,569	325,708	307,841	120,330	83,363	91,751
Finished material	12,342	12,626	10,495	15,873	16,528	15,675
Food products	735,977	698,749	649,251	102,800	83,998	105,782
Live cattle	99,782	98,772	107,630	240,907	237,018	164,152
Total	9,650,175	7,619,236	7,007,285	745,839	758,974	701,164

In Mr. Lindley's report on the German waterways, on page 206, an interesting statement of the "Classification of traffic on some of the more important lines of waterways for the year 1905" is given. The proportion in which the various classes of goods are represented at important points of the principal waterways in the transit, upstream or downstream traffic, and in the goods received or dispatched, based on the statistics of 1905, is shown.

According to the said report, of the total traffic at Ruhrtort-Duisburg, 13,640,000 tons, about 30 per cent are received and 70 per cent dispatched. Of the goods received, 4,200,000 tons, 60 per cent are ores, pig iron, and scrap, and 19.7 per cent agricultural produce.

Of the traffic dispatched from Ruhrtort-Duisburg, 9,450,000, a total of 8,840,000, or 93.6 per cent, are coal, coke, etc. Of this about 60 per cent go upstream and 40 per cent downstream.

In Hamburg, on the Elbe, of the total transit traffic, 5,920,000 tons, 58 per cent are upstream and 42 per cent downstream. Of the traffic upstream, 40.1 per cent are agricultural products, and of the downstream traffic 29.9 per cent is sugar and 24.8 per cent manure.

Of the water-borne traffic at Berlin and Charlottenburg in 1905, 10,110,000 tons, 93 per cent are goods received and only 7 per cent goods dispatched.

Of the goods received, 6,300,000 tons, or 66.8 per cent, consist of building materials: 1,430,000 tons, or 15.1 per cent, of coal, coke, etc.

Coal and ores are preponderant in the western basins, specially on the Rhine. Wood and agricultural produce form the chief articles of transport in the east, the Oder having at the same time a considerable transport of coal.

Besides this, special articles of produce, sugar, and salt form a large contingent in their respective basins—for instance, on the Elbe. In the neighborhood of larger towns, building materials, sand, gravel, stone, bricks, etc., are transported by water in large quantities; as, for instance, on the Mark waterways at Berlin, on the Rhine at Cologne, on the Main at Frankfort, and on the Weser at Bremen.

Besides the above information, taken from Mr. Lindley's report, more detailed data regarding the principal commodities moved, the proportion and character of traffic moved in different directions, are given on pages 78 to 81.

While there are no statistics available showing the relative importance of package and bulk freight, the former is a very small percentage of the water-borne traffic.

Besides the statistics of vessel movement and traffic carried on inland waterways and railroad traffic, tonnage, and ton mileage, furnished in the reports of other consular officers, submitted as annexes to this report, attention is called to the Statistical Year Book of the German Empire for 1909.

Taking important inland water routes, the through traffic predominates, but in what general proportion it would be difficult to estimate.

In a table, given on page 76 of Mr. Lindley's report, showing the summary of the total traffic on the inland waterways of Germany, exclusive of the estuaries navigated by seagoing vessels, set forth in great detail in Table G—12, page 200, the mean distance traveled by 1 ton of freight in 1875 was 132 miles; in 1895, 155 miles; in 1900, 153 miles, and in 1905, 139 miles. The increase in length of travel from 1875 to 1895 was due to the great development of long-distance transport, the decrease from 1895 to 1905, to an increase in the short distance and local traffic.

According to the latest schedule, the wages paid to labor employed on the waterways are as follows per month:

	Marks.
Captains of steamers	160=\$38.05
Mates of steamers	135= 32.13
Engineers of steamers	140= 33.32
Firemen of steamers	105= 24.99
Helmsmen of barges	135= 32.13
Boatmen on barges	105= 24.99

No mileage is paid. The wages include lodging, but not board. During the winter, when the boats are laid up, the wages of the captains and engineers of steamers are reduced 1 mark (\$0.238) per day; the other employees are discharged.

The captains and engineers also receive 1 per cent of the fees, such as towage fees, etc., paid, which amounts to from 50 to 100 marks (\$11.90 to \$23.80) per year.

The hours of labor are from 6 a. m. to 6 p. m. Overtime is paid at the rate of 50 pfennigs (11.9 cents) per hour up to 10 p. m. After that time 60 pfennigs (14.28 cents) per hour, for all the people employed.

The above tariff, by the terms of which all wages were increased, was the result of an agreement entered into by the navigation companies and private owners of steamers and barges and the workmen's unions. It went into effect in October last, and applies to the navigation on the Elbe, Oder, Spree, and Havel.

The existing laws regarding insurance against sickness, accident, old age, and invalidity cover all persons employed on the waterways.

SUPPLEMENTARY REPORTS.

1. Rivers and canals in the consular district of Hamburg. Report by Robert P. Skinner, consul-general, page 69.
2. Rivers and canals in the consular district of Magdeburg. Report by James L. A. Burrell, vice-consul, page 85.
3. Rivers and canals in the consular district of Bremen. Report by William Thomas Fee, consul, page 97.
4. Rivers and canals in the consular district of Barmen, with descriptions of the Dortmund-Ems Canal and the inland harbors of Dortmund, Duisburg-Ruhrort, Neuss, and Düsseldorf. Report by George Eugene Eager, consul, page 103.
5. Rivers and canals in the consular district of Cologne. Report by H. J. Dunlap, consul, page 125.
6. Inland waterways and canals in the consular district of Breslau. Report by Herman L. Spahr, consul, page 131.
7. Rivers and canals of the upper Rhine district. Report by William J. C. Teichmann, consul, page 139.
8. Rivers and canals in Baden. Report by Ernest L. Ives, vice-consul at Mannheim, page 151.
9. Rivers and canals of the upper Rhine district. Report by William J. Pike, consul at Kehl, Baden, page 157.
10. Railway rates, inland waterways and canals of Bavaria. Report by Thomas Willing Peters, consul-general at Munich, page 163.
11. Bavarian waterways and canals. Report by George Nicolas Ifft, consul at Nuremberg, page 175.

These reports are in the main replies to the questions found on pages 3 and 4.

RIVERS AND CANALS IN THE CONSULAR DISTRICT OF HAMBURG.

Report by ROBERT P. SKINNER, *Consul General.*

I. PUBLIC SUPERVISION.

I. (a) The various State authorities exercise supervision over the Elbe where it passes through their respective territories. In Prussia the chief president of the Province of Saxony is also the chief of the Elbstrombauverwaltung, and he has authority over river navigation within that Kingdom. In the Duchy of Anhalt this supervision is exercised by the department of the interior; in the Kingdom of Saxony the Amtshauptmannschaften of Pirna and Dresden-Neustadt act as Stromamt. In the State of Hamburg the department of commerce and navigation is in control, although the buildings and improvements on the banks of the river are in charge of the building department. There are, moreover, various local regulations which apply where the river flows through cities, but these are more properly local police regulations prescribed because of the particular circumstances.

The State of Lübeck built the entire Elbe-Trave Canal at its own expense, although this canal traverses other territory, and the State of Lübeck supervises navigation over the same.

(b 1) The various authorities mentioned in the preceding paragraph are public functionaries and have no powers or duties in respect to the capitalization of navigation companies or the regulation of their rates. It is their duty to maintain and improve the channel and to provide regulations for the ordinary and orderly dispatch of business and for the general security and interest of the public. Neither do these authorities have anything to do with the maintenance and improvement of terminal facilities, which, in most instances, are private property, being generally owned and operated by private shipping companies, and, in a few instances, occupying municipal property which is leased to the shipping company.

(b 2) Statistics relating to German river navigation are collected in part by the Imperial statistical bureau and in part by the various State offices. Some navigation companies collect private statistics for their own use.

II. (a) There is no established policy as to water power developed by works constructed for the improvement of navigation on the Elbe.

(b) River improvements and the building of canals are carried on by State governments and not by private associations. As mentioned before, the Elbe-Trave Canal, which merely terminates at Lübeck and does not traverse the territory of that State, was built at that State's expense.

(c) There are no elaborate terminal facilities in Hamburg, as traffic conditions apparently do not require their existence. The river-borne traffic between Hamburg and inland points is in reality nothing less than an extended lighterage service, the river barges unloading and receiving their cargoes, as a rule, directly alongside the ocean-going steamers and sailing vessels. It is precisely because of the facilities for exchanging their cargoes in this manner that river traffic from and to Hamburg has attained such immense proportions.

III. Answers to questions appearing under III, "Floating equipment," will be found in the next following pages.

STATISTICS OF VESSELS ON GERMAN WATERWAYS.

According to the "Regulations regarding statistics of the fleets of German river and canal ships," approved by the Federal Council in December, 1907, such statistics are required to be made every five years (at the end of every fifth year), and they must comprise all freight and passenger ships used for business purposes (namely, all without motive power of 10 and more tons' capacity, and all business vessels with motive power).

Besides the river and canal craft proper, such vessels must be included in the statistics as are engaged at the mouths of rivers and canals and on bays, as well as on lakes in the interior, and which are not included in the statistics of seagoing vessels, particularly also such seagoing vessels by which the transfer from river and canal navigation to deep-sea navigation is effected (for instance the seagoing Rhine steamers, seagoing lighters, and similar craft). The statistics must be made at the respective home ports of the ships.

The first statistics were collected under these regulations on December 31, 1907, and the result thereof was published in the "Statistics of the German Empire," fourth quarter, 1908.

Accordingly, the following number of ships was counted:

Steamships.	Passenger ships.			Total, including tugs and motor boats.		
	Number.	Capacity.	Horse-power.	Number.	Capacity.	Horse-power.
Coast waters of the Baltic, east of the Vistula.....	25	<i>Tons.</i> 1,182	2,303	117	<i>Tons.</i> 6,422	11,150
Waters of the Vistula.....	40	1,099	3,788	82	4,168	8,673
Coast waters of the Baltic, between Vistula and Oder.....	1	8	8	4	17	40
Waters of the Oder.....	52	2,416	5,384	391	21,149	53,756
Coast waters of the Baltic, west of the Oder.....	41	1,003	2,276	149	2,532	5,048
Coast waters of the North Sea, Schleswig Holstein.....	4	99	248	8	129	270
Waters of the Elbe.....	402	13,792	37,400	1,771	75,985	176,485
Waters of the Weser.....	18	1,045	1,802	91	8,012	13,450
Waters of the Ems.....	10	255	431	58	4,776	5,615
Waters of the Rhine.....	94	8,188	26,297	567	56,489	187,828
Lake of Constance.....	20	817	2,930	46	2,339	4,000
Waters of the Danube.....	1	45	42	12	1,731	4,919
Lakes of Upper Bavaria.....	11	392	2,130	15	399	2,185
Total.....	719	30,341	85,039	3,311	184,148	473,419

Of these 3,311 ships there were in all 240 wooden vessels (only 7 on the waters of the Rhine). The largest draft of these vessels was 3.85 meters (12.32 feet) on the Elbe, and 2.77 meters (9.09 feet) on the Rhine; however, the steamers plying on the Rhine had in general the largest dimensions, the maximum dimensions of a vessel being 88.85 meters (281.65 feet) length, 20.7 meters (67.91 feet) beam, and 10 meters (32.8 feet) height. The steamers on the Elbe had the next largest dimensions.

Ships without motive power.	Number.	Capacity.
Coast waters of Baltic east of Vistula.....	819	<i>Tons.</i> 112,389
Waters of the Vistula.....	496	79,047
Coast waters of Baltic, between Vistula and Oder.....	4,051	993,565
Waters of the Oder.....	477	33,541
Coast waters of Baltic, west of Oder.....	5	188
Coast waters of North Sea, Schleswig-Holstein.....	12,005	2,340,985
Waters of the Elbe.....	474	151,599
Waters of the Weser.....	33	992
Coast waters between Weser and Ems.....	960	98,554
Waters of the Ems.....	3,477	2,115,465
Waters of the Rhine.....	17	2,845
Lake of Constance.....	107	58,918
Waters of the Danube.....	2	23
Total.....	22,923	5,988,111

Of these ships 14,290 were built of wood; the remaining 8,633 of iron or other metal. While on all other rivers and canals of eastern Germany, wood is extensively used as building material for river craft, there were only 1,150 wooden ships among the 3,477 Rhine vessels, or approximately one-third. The largest draft, 5.8 meters (19.03 feet), is found among the first group (coast waters of the Baltic, east of the Vistula); the greatest length and height, 102.6 and 9.8 meters (336.62 and 32.15 feet), respectively, is represented among the ships plying on the Rhine, while a vessel employed on the Elbe has the greatest beam, 13.8 meters (45.27 feet). Among the Rhine ships the greatest beam is 12.08 meters (39.63 feet).

Consequently, according to the foregoing figures the fleet of German inland waterway ships consisted of 26,234 vessels, aggregating a carrying capacity of 6,172,259 tons. Thereof 14,530 were wooden vessels and 11,704 vessels built of iron or other metal. The largest number of ships and greatest tonnage are employed on the Elbe waters, namely, 13,776 ships of 2,416,970 tons, the Rhine holding the second rank, there plying 4,044 vessels of 2,171,954 tons on this river and adjacent waters. Then follow the Oder waters (4,442 ships of 1,014,714 tons), Weser waters (565 ships of 159,611 tons), coast waters of the Baltic, east of the Vistula (936 ships of 118,811 tons), Ems waters (1,118 ships of 103,330 tons), Vistula waters (578 ships of 83,215 tons), Danube waters (119 ships of 60,649 tons), etc. Notwithstanding the enormous traffic in Hamburg, which is the home port of 6,733 vessels plying on inland waterways, the fleet on the Elbe waters is only a little ahead of that employed on the Rhine, the difference in tonnage being 245,016 tons.

The following statistical table also gives an interesting picture of the fleet of German river and canal vessels, particularly in regard to their relative size or tonnage:

Fleet of German River and canal vessels on December 31, 1907.

	Number of ships.	Number of ships the tonnage of which has been ascertained.	Total.	Tonnage.							
				Number of vessels the tonnage of which was—							
				Below 50 tons.	50-100	100-150	150-250	250-400	400-600	600-800	800 tons and more.
Total.....	26,235	26,191	5,913,020	7,393	3,537	1,859	6,301	3,122	1,867	899	1,213
Ships without motive power.....	22,923	22,899	5,725,258	5,095	3,102	1,658	6,060	3,037	1,853	888	1,206
Ships with motive power.....	3,312	3,292	188,762	2,298	435	201	241	85	14	11	7
Passenger ships (including launches and motor boats).....	1,067	1,067	33,476	862	164	13	19	9	.....	.....	7
Freight ships.....	642	641	70,580	345	51	63	107	45	14	9	7
Tugs.....	1,558	1,539	81,654	1,071	203	125	107	31	.....	2	.....
Chain steamers.....	45	45	3,052	20	19	.....	8	.....	.....	.....	.....

Vessels on the Elbe carry up to 1,500 tons burden, and have a draft of 1.90 meters (6.233 feet) when fully laden. Modern barges and canal boats are made of iron and steel chiefly. The Vereinigte Elbschiffahrts Gesellschaft, A. G., states that the average cost of a 1,000-ton steel barge is 50,000 marks (\$11,900), and an oak-wood barge 40,000 marks (\$9,520). However, the wooden barges are rapidly becoming obsolete.

Special types of barges are in use for the transportation of lumber and iron of large dimensions, for which vessels without bulkheads are employed and in which an undivided hold is available.

All vessels used on the Elbe and tributaries are adapted to medium stages, being always built with broad flat bottoms.

IV. OWNERSHIP OF VESSELS AND BUSINESS ORGANIZATION.

While there is free competition on the Elbe, and of such an active nature that the section of the Hamburg bourse occupied by vessel owners is quite important, it is also true that a number of large corporations have forged to the front, maintaining organized services and exercising a power of control over rates and conditions.

The Vereinigte Elbschiffahrts-Gesellschaften, A. G., Dresden and Hamburg, maintains an Elbe-going service by means of 71 side-wheel steamers, 24 chain steamers, and 34 harbor steamers; on the Saale the same company has 5 chain steamers; on the Oder 4 side and stern wheel steamers. The same company owns 29 warehouses and pontoon ships, 419 freight steamers, and 235 small lighters. The chain steamers referred to are propelled by means of a cogwheel, the teeth of which fit into a towing chain laid in the river bottom, on the principle of the cog and pinion mountain railways. The length of the towing chain on the Elbe from Niegripp to Melink is 458 kilometers (285 miles) and on the Saale from Barby to Halle 107 kilometers (66 miles). The indicated horsepower of the above-mentioned 71

side-wheel towing steamers varies between 250 and 1,200; they are from 50 to 72 meters (164 to 263 feet) long, 5.2 to 9 meters (17 to 29 feet) wide, or 10.36 to 18.7 (33 to 61 feet) over the paddle box, and their crews consist of from 8 to 12 men. The company's fleet includes 19 express freight steamers of from 170 to 350 indicated horsepower, and are from 55 to 65 meters (180 to 213 feet) in length and 5.5 to 7 meters (18 to 22 feet) wide, or 11.6 to 12.8 meters (38 to 42 feet) wide over the paddle box. These express steamers have crews of 8 men. The company's 30 chain steamers on the Elbe and Saale have 66, 90, 120, and up to 180 indicated horsepower, vary in length from 32 to 55 meters (104 to 180 feet), in width from 5.5 to 8.2 meters (18 to 26 feet), and have crews of 7 men. Screw steamers to the number of about 39 have from 40 to 250 indicated horsepower, are from 12 to 25 meters (39 to 82 feet) in length, 3.2 to 5.2 meters (10 to 17 feet) broad, and have crews of 3 and 4 men. This company possesses a steam dredge, 7 steam launches, 9 motor boats, 2 repair ships, 4 floating steam derricks, 19 floating steam winches, 5 small barges with winches, 9 stationary derricks, 2 electric derricks, and 1 derrick for the removal of masts. In addition to its own fleet, this company operates about 700 vessels on regular time charters, and either owns or leases warehouses in Dresden, Magdeburg and Hamburg.

The Neue Deutsche Böhmische Elbe-schiffahrt, A. G., was established in Dresden in 1907, and owns a fleet of 14 side-wheel tow-boats of from 500 to 1,225 indicated horsepower, 4 harbor steamers of from 250 to 375 horsepower, 50 iron freight barges of from 500 to 850 tons carrying capacity, 7 wooden freight barges of from 400 to 650 tons, about 70 chartered freight barges of from 500 to 1,200 tons, and a few small craft.

The Neue Norddeutsche Fluss-Dampfschiffahrts-Gesellschaft, of Hamburg, maintains a freight and towing service between Hamburg, Magdeburg, Schönebeck, Aken, Wallwitzhafen, Torgau, and Berlin. It has at its disposition 8 side-wheel steamers of from 180 to 900 indicated horsepower, 1 twin-screw steamer of 280 horsepower, 4 harbor tugs of from 90 to 300 horsepower, 65 iron freight barges aggregating 37,100 tons, 4 barges serving for warehousing purposes, and a number of small auxiliary vessels and derricks.

Fr. Andreac, G. m. b. H., of Magdeburg, maintains a regular freight service on the Elbe between Magdeburg and Hamburg, a regular express service from Magdeburg to Berlin, Mecklenburg, and Silesia, and vice versa, and from Magdeburg to Stettin, other places in Pomerania and the Baltic provinces. The corporation operates 5 freight steamers, 16 iron barges for the Elbe service, of from 500 to 1,500 tons, for canal traffic 14 iron and 2 wooden barges, and a number of smaller vessels stationary in the harbors of Stettin and Magdeburg. The firm further owns a terminus of its own in Magdeburg, with steam and gas derricks and warehouses.

The Berliner Lloyd, A. G., with its seat in Berlin, maintains a regular freight-towing service and daily express service between Hamburg and Berlin, a triweekly express service between Hamburg and Breslau, between Magdeburg and Landsberg on the Warthe, and Oder stations, as well as between Goyatz, Oder stations, and Hamburg. The company owns 23 express freight steamers of from 150 to

300 horsepower and from 250 to 700 tons capacity, 2 motor barges of 100 horsepower and 500 tons burden each, 5 tugs of from 150 to 300 horsepower and 2,000 to 3,000 towing capacity each, and 5 smaller towing steamers of from 80 to 200 horsepower, 60 first-class freight barges, aggregating 50,000 tons carrying capacity, a steam derrick in Berlin, and a complete service in Hamburg for the handling of freight in the port, the fleet for this purpose consisting of 80 iron harbor barges.

Lueders & Stange, of Hamburg and Lübeck, maintain a regular freight and express service from Lübeck to Hamburg, Lauenburg, Magdeburg, Berlin, and other stations on these routes. The express service between Hamburg is maintained by 2 steamers, besides the firm operates 12 of its own and a number of chartered barges; it possesses a modern terminus in Lübeck, with three spacious warehouses.

Behucke & Mewes, of Hamburg, maintain a freight and towing service between Hamburg and Magdeburg, Schönebeck, Aken, Wallwitzhafen, Torgau, Riesa, Meissen, Dresden, Laube, Tetschen, Schonpriesen, Aussig, and Berlin. The company owns 8 towing steamers of from 200 to 800 indicated horsepower, and besides, regularly employs a number of chartered steamships.

The Privatschiffer Transportgenossenschaft e. G. m. b. H., of Auen on Elbe, is a corporation formed by a number of private barge owners; it was established in 1904 and consists of 676 members. They have at their disposal a fleet of 678 barges, aggregating 400,000 tons.

The canals and rivers are controlled by the various governments, none of which operate fleets of their own. The tendency, as is the case in all classes of German business, is toward organization upon the "community of interests" basis. Thus there is an Interessen-Geweinschaft between the Oesterreichische Nordwest Dampfschiffahrts-Gesellschaft, the Deutsch Oesterreichische Dampfschiffahrt Actien Gesellschaft, the "Elbe" Dampfschiffahrts Actien-Gesellschaft, for their mutual advantage. This fusion was created in 1907, and under it the first-named companies leased to the Vereinigte Elbeschiffahrts-Gesellschaft their entire business with their fleets, and obtained a proportionate share in the resulting profits.

A few inland coal dealers at Berlin and elsewhere operate river vessels of their own for the transportation of bituminous and brown coal from Bohemia. There is no important ownership of vessels on the Elbe by railroads or producing concerns; neither are any fleets of merchant vessels owned or operated by public authorities.

It was feared that when the combination referred to above, the Vereinigte Elbeschiffahrts-Gesellschaft, A. G., took over other important interests it would exercise a monopoly of Elbe traffic. However, very soon after the formation of this trust, the Deutsch Böhmische Dampfschiffahrts-Gesellschaft was organized, and there are a number of smaller concerns operating direct steamship and towing services, and, finally, the innumerable barge owners have an association by means of which they compete successfully against the large companies, and could strike back effectively in the event of a rate war breaking out. Since the individual barge owners are associated the difference between their organization and the very power-

ful one first described is one of degree rather than of principle. Perhaps it might be stated that the individual barge owner carrying on his own business in his own limited way no longer exists.

V. TERMINAL FACILITIES.

The Hamburg port equipment and organization probably has no superior in the world. Vessels engaged in inland navigation also have full use of the Hamburg quays, but there are no wharves or other terminal facilities specially constructed for river craft, other than a few sheds and derricks for the collection and manipulation of general merchandise, and these are owned and operated by the Vereinigte Elbeschiffahrts-Gesellschaft.

As I have already stated, vessels employed on the inland waters usually come alongside the seagoing vessels in the port of Hamburg, from which they receive cargo, or into which they discharge their own. The city quays are well equipped with cranes of every description and modern apparatus for handling grain and bulk articles. In this respect the port is certainly not in advance of first-class American ports—probably the contrary.

Railroad tracks are located alongside nearly all the quays of Hamburg, thus permitting a direct exchange of traffic between the railroads and seagoing vessels. The track facilities are seldom used in connection with inland navigation, as the river craft have no need for such facilities. The only harbor in the port of Hamburg in which river barges lay is chiefly a winter refuge, and, indeed, has no railroad connections at all.

The docks of Hamburg, together with the free port, are all property of the State, managed in the interest of the general public. Such canal terminals as exist are privately owned and operated, but the real terminals are those created by nature, as already explained.

DOCKAGE FEES AND TERMINAL CHARGES.

[Extract from the Service Regulations and Tariff of Fees regarding the quays of Hamburg.]

SEC. 22. For the use of the quays, including the quay sheds, the Hamburg quay administration charges the following fees:

I. A tonnage fee:

(a) For discharging and loading and for discharging or loading within not more than five times 24 hours, 17.5 pfennigs per cubic meter net tonnage (4.16 cents per 1.308 cubic yards net tonnage).

(b) For every additional 24 hours of demurrage or fraction thereof, 3.5 pfennigs per cubic meter net tonnage (0.8 cent per 1.308 cubic yards net tonnage).

This fee is payable by the ship alone.

II. A loading fee on all goods discharged or loaded over the quays of 10 pfennigs per 100 kilos (2.38 cents per 220 pounds). Of this loading fee seven-tenths are payable by the ship and three-tenths by the owner of the merchandise. The quay administration collects the entire fee from the representative of the vessel, leaving it to his discretion to collect from the owners of the goods their share in the fee.

The administration is authorized to control the weight of shipments of goods. If the same is found to be in excess of 5 per cent over the declared weight the regular weighing fee (as per tariff referred to later) is collected. On goods in packages of an average weight usually entered in cargo manifests of ships according to the number of packages (such as barrels of herrings, hogsheads of wine, etc.) the weight is fixed by the quay administration. If other goods are found to be entered in cargo manifests without the weight being stated, and such weight not having been ascertained otherwise, the administration can cause such goods to be weighed at the expense of the ship's representative, charging the regular weighing fees.

III. If goods have been discharged at the quay from a seagoing vessel and are transferred at the same quay to another seagoing ship, or to a vessel engaged in coastwise trade, or to a barge, etc., the loading fee for the reloading of the goods is reduced to 5 pfennigs per 100 kilos (1.19 cents per 220 pounds) and the tonnage fee for the vessel receiving the merchandise to 12 pfennigs per cubic meter (2.86 cents per 1.308 cubic yards) net tonnage, provided the use of the quay by the latter ship is restricted to the loading of such goods and is not intended for other purposes.

IV. (a) At the time of delivery of goods imported by sea, payable by the recipient of the goods:

1. Landward, except when delivered into railroad car (a special tariff of fees being prescribed for the service of the quay railroad), 8 pfennigs per 100 kilos (1.90 cents per 200 pounds).

2. Into open or covered harbor barges, free.

3. Into river craft, 5 pfennigs per 100 kilos (1.19 cents per 220 pounds).

(b) At the time of delivery of goods destined for exportation by sea, payable by the deliverer of the goods:

1. Delivered from land, 8 pfennigs per 100 kilos (1.90 cents per 220 pounds).

2. Delivered by water, 10 pfennigs per 100 kilos (2.38 cents per 220 pounds).

SEC. 23. If goods, such as bulk articles, are discharged over the quay directly into railroad car, or vice versa, without being stored in the quay sheds or on the quays, the following fees are charged instead of those above stated:

1. On fertilizers of all kinds, pig iron, ore, nitrate, rice, asphalt, lead, coal and coke, cement, grain in bags, stones, sand, sugar, salt, kainite, slate, flagstones, railroad rails and ties, cottonseed meal and cake, raw-iron goods, bar iron, magnesium chloride, crude zinc, as well as all other metals of low value, iron and steel wire (also barbed wire) in rings or embalming, coal briquettes, gypsum, and ice in blocks, and structural iron, 5 pfennigs per 100 kilos (1.19 cents per 220 pounds).

2. On cotton, hides, oil cake, wool, jute, herrings, potatoes, corkwood, dyewoods, empty bottles (loose, not packed) in crates, sheet iron, hay in bales, machinery, and meat, 7.5 pfennigs per 100 kilos (1.78 cents per 220 pounds).

The Hamburg Department of Commerce and Navigation has the right to designate other goods as bulk articles of the foregoing classes subject to the lower rates of charges.

This fee is payable by ship and recipient, or deliverer, each party paying one-half; however, the whole amount is collected from the ship's representative, who has the right to charge the moiety to the owner of the goods.

For the transportation of the said bulk goods over the tracks of the quay and harbor railway, the harbor railway fee, reduced to 3 pfennigs per 100 kilos (0.71 cent per 220 pounds), is charged. This reduced rate is only applied when the goods pass directly from ship into car, or vice versa, without being stored on the quay.

If goods from a ship or a railroad car thus stored on the quays are, in consequence of a change in the disposition as to their destination, not loaded into car or ship, but are removed from the quay by cart or river craft, the fee prescribed in section 22 (IV), payable by the representative of the shipment, is charged in addition to the fee prescribed in the first paragraph of this section, and in such case the fee also amounts to 5 pfennigs per 100 kilos (1.19 cents per 220 pounds) when the goods are transferred into open or covered harbor barges.

SEC. 24. If, with the consent of the quay administration, goods are delivered at a quay for a seagoing vessel which does not load such goods from alongside the quay, an additional fee (besides the one prescribed in section 22 (IV b)) is payable by the representative of the ship for the dispatch of the goods ex quay to ship. Such charges are as follows:

1. If the ship has, during the same voyage, used the quay previously for discharging or loading, or for both, and has therefore paid the tonnage fee, 10 pfennigs per 100 kilos (2.38 cents per 220 pounds).

2. If not, 20 pfennigs per 100 kilos (4.76 cents per 220 pounds).

In all other cases where goods have been accepted, exceptionally, by the quay administration, which have neither been discharged from seagoing vessels nor are intended to be loaded into such vessels, a fee of 20 pfennigs per 100 kilos (4.76 cents per 220 pounds) is charged for the receiving and delivering of the goods, payable by the party at whose instance the work was done.

SEC. 25. The fees for the use of the collecting and distributing shed in connection with the transportation of goods over the lines of the harbor and quay railroad are fixed by the "Eisenbahn-Kai-Regulativ" of August 15, 1888.

A reduction of the tariff rates is granted, except in cases of the kind mentioned in section 23, on bunker coal directly transferred from railroad car to vessel, without the assistance of employees of the quay administration or the use of material, tools, etc., belonging to it, the reduced charge being 1 pfennig per 100 kilos (0.24 cent per 220 pounds). However, the minimum fee is 1 mark (23.8 cents) per railroad car.

SEC. 26. (No charge is made for the storage of goods on the quays and in the quay sheds during the first two workdays after the day of discharge or delivery.) After such two free days the storage fee amounts to 2 pfennigs per 100 kilos (0.48 cent per 220 pounds) per workday; however, some articles it is reduced or increased as follows:

1. Grain, oil seed, flour, legumes, and cattle feed of all kinds, including oil cake, 1 pfennig per 100 kilos per workday (0.24 cent per 220 pounds).

2. Empty barrels, baskets, boxes, etc., 6 pfennigs per 100 kilos per workday (1.43 cents per 220 pounds).

3. Machinery, the storage of which is permitted in the open, 10 pfennigs per 100 kilos per month (2.38 cents per 220 pounds).

4. Bulk goods stored on the quay (sec. 23), 2 pfennigs per 100 kilos per month (0.48 cent per 220 pounds).

On goods delivered on the quays, but removed again therefrom (sec. 24), the storage fee is charged from the date of delivery.

SEC. 27. The weighing charges, payable by the person at whose instance the work is done, are as follows:

1. Weighing goods at the time of stowing or receiving, 6 pfennigs per 100 kilos (1.43 cents per 220 pounds).

2. Weighing and repiling goods, 10 pfennigs per 100 kilos (2.38 cents per 220 pounds).

3. Weighing goods by the piece, 12 pfennigs per 100 kilos (2.86 cents per 220 pounds), but not less than 6 pfennigs (1.43 cents) per package.

The weighing of goods loaded into railroad cars, in order to ascertain the weight for the railroad, is done free of charge, except for bulk goods (sec. 23) directly transshipped, if weighing of the goods on the part of the quay administration is desired by the owner. In such cases a weighing fee of 4 pfennigs per 100 kilos (0.95 cent per 220 pounds) is charged.

The foregoing weighing fees Nos. 1, 2, and 3 may also be charged when the weighing is done by the owner of the goods by means of his own instruments and with his own men.

SEC. 28. In the way of craneage on packages or pieces weighing more than 2 metric tons (2,200 pounds), including the use of chains, the following charges are made:

	Per 100 kilos (220 pounds).			
	In transshipment from railroad to ship, and vice versa.	In all other cases.	Pfs.	Cts.
Pieces weighing (metric tons)—				
2 to 3 tons.			5	1.19
3 to 5 tons.			10	2.38
5 to 7½ tons.			15	3.57
7½ to 10 tons.			20	4.76
10 to 12½ tons.			25	5.95
12½ to 15 tons.			30	7.14
15 to 17½ tons.			35	8.33
17½ to 20 tons.			40	9.52
20 to 25 tons.			45	10.71
25 to 30 tons.			50	11.90
30 to 35 tons.			55	13.09
35 to 40 tons.			60	14.28
40 to 50 tons.			65	15.47
50 to 60 tons.			70	16.66
60 to 70 tons.			72½	17.25
70 to 80 tons.			75	17.85
80 to 90 tons.			77½	18.45
90 to 100 tons.			80	19.04
100 to 110 tons.			82½	19.64
110 to 120 tons.			85	20.23
120 to 130 tons.			87½	20.83
130 to 140 tons.			90	21.42
140 to 150 tons.			100	23.80

If the loads are desired to be deposited longer than is necessary for the transfer, one-half of the crage is charged for the second lifting, besides the regular storage fees.

SEC. 29. For work performed outside the regular hours of labor, an additional fee is charged for every discharging and loading gang, as follows: Until 10 p. m., 5 marks (\$1.19) per hour or fraction thereof after 10 p. m., 7.50 marks (\$1.78).

On Sundays and holidays the additional fee is 15 marks (\$3.57) for every discharging or loading gang.

SEC. 30. The minimum charge of any kind under the foregoing tariff is 30 pfennigs (7.14 cents). Fractions of 100 kilos are counted a full 100 kilos, and bills are always rendered in round figures.

SEC. 31. For the issuance of a certificate, as well as for the filing of an application for the storage of goods, a fee of 1 mark (23.8 cents) is collected.

For the issuance of a certificate regarding the partial delivery of a shipment, a fee of 30 pfennigs (7.14 cents) is charged.

For the repairing of packings and for other extraordinary work, 20 per cent thereof is charged in addition to the actual cost or expense.

VI. TOLLS AND FREIGHT RATES.

Tolls are not charged on German rivers, but only on artificial canals. The following is the tariff of fees per ton of 1,000 kilograms (2,200 pounds) in effect on the Elbe-Trave Canal, which is within this jurisdiction, and payable when vessels pass the pay stations at Lauenburg and Bussau:

1. On goods transported, namely:¹

	Pfennigs.
Class I-----	11 (\$0. 026)
Class II-----	9 (. 021)
Class III-----	7 (. 016)
Class IV-----	5 (. 011)

The minimum charge is the fee payable by an empty vessel, as stated in paragraph 2.

2. On empty vessels, 0.2 pfennig (\$0.000476) per ton capacity.
3. On tugs, without ships in tow, 1 mark (\$0.238).
4. On passenger ships, 0.5 pfennig (\$0.00119) per capita of persons allowed to be transported. (This fee is charged only when such ships have passengers on board; otherwise a fee according to paragraph 2 is charged.)
5. On fishing vessels, small sailing yachts, and other small craft not measured and used for the transportation of goods, if accompanied by a vessel of one of the above classes, 50 pfennigs (\$0.119); otherwise, 2 marks (\$0.476).
6. On rafts, 15 to 20 pfennigs (\$0.035 to \$0.047) per 10 square meters (107.64 square feet) of surface, according to the kind of timber used.
7. On goods transported on rafts, 50 pfennigs (\$0.119) per raft.
8. On ships permitted to pass the locks ahead of others arrived before:
 - (a) Laden vessels, passenger boats with passengers on board, tugs not towing, and rafts, 50 per cent additional charge to the regular fee.
 - (b) Empty vessels, 4 pfennigs (\$0.0095) per ton capacity.

¹ Goods are graded according to the general value and divided into four classes, for which a lengthy list exists.

9. For the use of landing stages, namely:

(a) For discharging and loading of goods, per ton, if more than 3 tons are moved:

	Pfennigs.
Class I-----	6 (\$0.0143)
Class II-----	5 (.0119)
Class III-----	4 (.0095)
Class IV-----	3 (.0071)

(b) For the moving of rafts, 4 pfennigs (\$0.0095) per 10 square meters (107.64 square feet) of surface.

Exempt from the payment of fees are goods and other articles which are the property of the German Empire, the King of Prussia, and the States of Lübeck and Prussia, dinghies belonging to large vessels and passing the pay stations with the latter, and tugs admitted by the canal administration.

There are no official tariffs for the transportation of freight on rivers and canals, as there is considerable competition and the rates fluctuate materially according to the demand for tonnage. In my report, dated August 16, 1909, examples were supplied of the comparative freight rates on the same classes of goods by rail and water, and from that report I quote a few of those examples:

[Rates per ton-mile.]

	By rail.		By water.	
	Distance.	Rate.	Distance.	Rate.
			Miles.	Miles.
Hamburg-Cologne	267	\$0.0085	342	\$0.0049
Hamburg-Kiel	68	.0109	87	.0082
Hamburg-Magdeburg	156	.0096	181	.0035
Hamburg-Lübeck	41	.0127	50	.0142
Hamburg-Bremen	71	.0111	93	.0076
Hamburg-Berlin	174	.0097	233	.0030
Hamburg-Breslau	379	.0075	493	.0030
Hamburg-Dresden	286	.0083	351	.0035

Freight rates on the Elbe have fluctuated from 14 to 42 pfennigs (\$0.033 to \$0.099) within one month. Much depends, as respects that particular river, upon the demand for tonnage for return cargo, as the Elbe is a river upon which freight is carried both ways, while on the Rhine freight is carried chiefly in one direction. Thus it may happen that there is an excessive demand for tonnage for freight from Hamburg to the interior and an absence of cargo for the return trip. At other times precisely the opposite situation may exist, and at still other times the demands for tonnage in both directions may about balance. Offers for transportation are made upon the Hamburg bourse every day, just as stocks and bonds and merchandise are offered for sale, and while the existence of large combinations of freight carriers tends to steady rates the changes are, nevertheless, frequent and rapid. The following extracts from reports issued by the Hamburg Chamber of Commerce set forth the German view of the situation in respect to river transportation:

1901. Development of river navigation not favorable. After a long winter and late opening of navigation business developed briskly, but calmed down in summer. At times water so low in the Elbe that barges to the middle Elbe could

only be half laden. Traffic above Dresden could only be maintained with difficulty. Same condition prevailed on the Oder. Deficiency in shipments of bulk goods depressed freight rates, and even large shipments of raw sugar and salt did not relieve the situation.

1902. The year a very unfavorable one. Due to general depression, freight rates were low, and the rise in these rates generally observed in spring because of the quantity of goods accumulated during winter failed to set in, because the preceding winter was very mild. Private barge owners suffered considerably under this situation. In fall freight rates on downward-bound goods increased, but not on those moved in the opposite direction. Improvement was not of a long duration, as winter set in early and navigation was consequently closed. It is hoped, however, that the deficiency caused thereby will be covered by the coming spring business.

1903. The situation remained unchanged in general. Although the quantity of goods shipped is increasing (chiefly sugar for exportation) and channel depth is generally favorable, competition makes itself too much felt; freight rates and towing charges remain too low, so that the business is not remunerative. In fall rates go up, chiefly on account of general improvement of commerce. The unsatisfactory situation in river navigation caused the three largest Elbe shipping companies to unite their interests by means of a fusion, hoping by doing so to be able to utilize their floating material more favorably and otherwise to obtain better results, chiefly by means of quicker transportation, without increasing freight and towing rates. Improper action on the part of the combine is not feared, as the same in no way represents the entire Elbe shipping, but would have to count always with keen competition by outsiders. It is hoped that this step is one toward sanitation of navigation on the Elbe, not alone to the benefit of the latter itself, but also of trade in general.

1904. Efforts to improve conditions in Elbe shipping business by means of further combinations have become useless, due to the extraordinary drought. In consequence of the latter the level of the Elbe sinks to 2.3 centimeters (0.9025 inch) below the zero mark, and in many places the river bed dried out entirely, an extraordinary occurrence. The prolonged drought caused shipping to be interrupted during fully three months, and goods usually transported over the waterways had to be shipped by rail or stored, thus in many cases being out of reach of their owners. In October, when navigation was resumed, an extraordinarily large demand on barge tonnage made itself felt, so that in many places there were not sufficient vessels available. A considerable rise in freight rates was the consequence, notwithstanding the profit derived therefrom does not suffice to make good for the previous deficiency. The individual owners of single barges suffer the greatest losses.

1905. A lively traffic both ways enabled owners of barges and river steamers to maintain freight rates at a remunerative level. Channel depth was generally favorable, so that the tonnage of the barges could be wholly utilized throughout the year. In general, the year was one likely to repair the damages of previous years.

1906. The expected rush as a forerunner of the increase of tariff rates going into effect on March 1 did not set in to the degree generally anticipated. Nevertheless business was favorable, and remunerative freight rates were paid. Later in the year freight rates receded, particularly so after the agreement between the Elbe steamship companies had been canceled.

The channel depths recede so considerably during August that in the beginning of September the companies in Dresden are compelled to discontinue shipping for a short while. Through this drought freight rates went up, and inasmuch as the fall business set in rather early the increased rates formed a favorable basis for the rest of the year. However, a strike breaking out in the middle of October and lasting until November somewhat influenced the situation. In general, the year was not a profitable one.

1907. River navigation looks upon this year as a favorable one, and daily freight rates were generally high; only during the last month business turned slack. River shipping business is influenced somewhat by the strike of the long-shoremen in Hamburg, inasmuch as this strike broke out at a time when business was favorable everywhere. In summer the Elbe shipping companies, which come into consideration for the local place, namely, the Privatschiffer Transportgesellschaft Dampfschiffahrts Aktien-Gesellschaft, the "Elbe," and the Deutsch-Oesterreichische Dampfschiffahrts A. G., leased their business to the Vereinigte

Elbeschiffahrts Gesellschaften, A. G., so that the latter obtained a monopoly-like position in the Elbe trade. However, in the fall a new enterprise, the "Deutsche Böhmischa Dampfschiffahrtsgesellschaft," was established, and thus new competition created.

1908. The year was one unfavorable to a high degree. The quantities of bulk articles shipped during spring and summer were considerably smaller than in the last preceding year. The effect was one particularly disadvantageous, as navigation could be opened early in the year, and as high water prevailed everywhere almost throughout the summer so that barges could be loaded to their maximum capacity. As business on the Oder was also slack, keen competition by ships generally employed on that river made itself felt on the Elbe, particularly in trade with the Havel. Freight rates remained on an extraordinarily low level throughout the year, and after a rise of short duration in July sank still lower during the latter six months as a consequence of lack of demand for tonnage.

Goods transported upon express steamers, which are 40 per cent faster than the slow boats, pay a rate which is double and sometimes which is three times as high as ordinary river freight rates.

There is no prorating arrangement between the water lines and state railways. There is, in fact, great competition between these two systems of transportation. The railroads have met the situation, to some extent, by offering favorable export rates on certain classes of goods. There is no legislation in Germany regarding the relations between the railroads and inland-water systems of transportation, neither is there any governmental restriction as to the lowering of railroad rates for purposes of competition with water rates. It probably would be regarded as contrary to public policy to institute a system of railway tariffs which might break down the river-shipping interests, which, in the long run, can handle bulk freight at a lower cost per ton-mile than is possible by railroad. It is undoubtedly the desire of the German people to maintain river and canal transportation up to the point of its highest efficiency.

German shippers insure their goods on inland waterways. The risk is not assumed by the carrier, although the latter frequently attends to the formalities, acting in the capacity of insurance agent, the premium in this case being added to the freight rates which are quoted either with or without insurance, according to the desire of the shipper.

Goods shipped from Hamburg to the interior by rail.

	Food products.	Building material and fuel.	Raw products and semimanufactures.	Dry goods and fancy articles.	Products of arts and industries.	Total.
1899.	Tons. 353,393	Tons. 99,878	Tons. 599,339	Tons. 14,499	Tons. 96,418	Tons. 1,163,527
1900.	360,331	154,801	675,254	20,335	154,060	1,306,414
1901.	338,459	100,589	675,732	15,448	92,124	1,222,352
1902.	357,298	98,063	615,004	15,949	83,985	1,170,299
1903.	355,811	72,464	609,511	14,763	81,990	1,134,539
1904.	505,096	105,781	926,791	20,587	120,576	1,678,822
1905.	523,531	186,761	730,650	21,541	135,290	1,697,773
1906.	529,165	128,156	920,112	24,951	161,209	1,763,593
1907.	663,971	147,446	964,696	24,918	172,801	1,973,832
1908.	606,907	126,253	961,823	22,604	161,655	1,879,246

Goods arrived in Hamburg from the interior by rail.

	Food products.	Building material and fuel.	Raw products and semimanufactures.	Dry goods and fancy articles.	Products of art and industries.	Total.
	<i>Tons.</i>	<i>Tons.</i>	<i>Tons.</i>	<i>Tons.</i>	<i>Tons.</i>	<i>Tons.</i>
1899.	341,559	1,200,091	254,712	46,860	357,570	2,200,792
1900.	398,400	1,179,536	295,659	51,987	435,295	2,360,877
1901.	386,326	1,277,863	324,106	46,557	388,484	2,423,336
1902.	408,493	1,308,084	309,993	50,254	412,337	2,489,161
1903.	412,527	1,352,557	276,314	53,265	451,358	2,546,021
1904.	445,144	1,513,624	474,039	57,807	546,200	3,036,814
1905.	335,718	1,535,060	367,433	59,868	567,075	2,865,154
1906.	416,840	1,774,878	390,578	66,050	640,063	3,288,409
1907.	466,206	1,816,107	408,484	67,789	700,306	3,458,892
1908.	452,152	1,780,965	434,523	58,382	631,455	3,357,477

Goods shipped from Hamburg to the interior by water.

	Food products.	Building material and fuel.	Raw products and semimanufactures.	Dry goods and fancy articles.	Products of art and industries.	Total.
	<i>Tons.</i>	<i>Tons.</i>	<i>Tons.</i>	<i>Tons.</i>	<i>Tons.</i>	<i>Tons.</i>
1899.	1,164,299	618,283	1,679,596	6,580	45,370	3,514,108
1900.	1,074,893	763,396	1,560,558	5,764	52,603	3,457,214
1901.	1,397,165	574,532	1,457,034	6,546	54,664	3,489,941
1902.	1,227,662	619,386	1,431,153	8,259	49,424	3,335,884
1903.	1,272,908	739,812	1,729,335	7,264	50,449	3,799,768
1904.	954,756	561,282	1,456,035	4,098	36,845	3,013,016
1905.	1,571,146	1,038,809	1,964,558	6,732	62,220	4,643,465
1906.	1,509,215	1,263,463	2,171,542	4,347	59,417	5,007,984
1907.	1,609,448	1,811,191	2,347,708	7,727	68,069	5,844,143
1908.	1,263,246	1,994,136	2,193,764	7,876	63,702	5,522,724

Goods arrived in Hamburg from the interior by water.

	Food products.	Building material and fuel.	Raw products and semimanufactures.	Dry goods and fancy articles.	Products of art and industries.	Total.
	<i>Tons.</i>	<i>Tons.</i>	<i>Tons.</i>	<i>Tons.</i>	<i>Tons.</i>	<i>Tons.</i>
1899.	1,185,613	617,360	506,380	1,729	124,358	2,435,440
1900.	1,312,343	557,542	596,443	1,529	139,063	2,606,920
1901.	1,267,254	525,099	653,011	1,277	118,965	2,565,606
1902.	1,141,423	587,681	588,237	1,807	130,265	2,449,413
1903.	1,612,161	730,936	707,407	2,712	173,770	3,226,987
1904.	979,620	541,157	532,603	2,294	122,382	2,178,056
1905.	1,057,611	832,296	925,036	4,686	181,543	3,001,172
1906.	1,498,088	969,961	905,350	5,013	189,385	3,567,797
1907.	1,258,872	912,605	813,900	4,924	196,507	3,186,808
1908.	1,241,793	907,232	755,401	3,980	174,370	3,082,776

Vessels and rafts arrived in Hamburg from the Upper Elbe during 1908.

From—	Self-propelled freight steamships.					
	Laden.			Empty.		
	Number.	Tonnage.		Number.	Tonnage.	
		Total.	Average.		Total.	Average.
Oder.....	75	21,313	284	.....	.....	.....
Havel.....	296	72,391	245	.....	.....	.....
Saale.....	126	38,382	305	.....	.....	.....
Elbe.....	2,134	256,965	120	67	9,127	136
Elbe-Trave Canal.....	.....	.....	.....	.....	.....	.....
Total.....	2,631	389,051	148	67	9,127	136

From—	Barges in tow.						Steam tugs.		
	Laden.			Empty.			Number.	Tonnage.	
	Number.	Tonnage.		Number.	Tonnage.			Total.	Average.
		Total.	Average.		Total.	Average.			
Oder.....	847	289,616	342	6	1,769	295	4	622	130
Havel.....	1,469	480,957	327	5,165	2,004,218	388	1,082	104,782	97
Saale.....	555	189,919	542	2	610	305	2	134	67
Elbe.....	8,264	3,975,589	481	2,710	1,254,943	463	1,275	248,841	195
Elbe-Trave Canal.....	557	131,008	235	202	77,847	385	2	40	20
Total.....	11,692	5,067,089	433	8,085	3,339,387	413	2,365	354,419	150

WAGES PAID ON INLAND WATERWAYS.

On express and other steamers plying on the Elbe the masters receive from 130 to 140 marks (\$30.94 to \$33.32) per month, the engineers from 115 to 125 marks (\$27.37 to \$29.75), the first mate 125 marks (\$29.75), and the second mate 100 marks (\$23.80). The monthly wages of the firemen amount to from 90 to 100 marks (\$21.42 to \$23.80), and of the deck hands to from 90 to 95 marks (\$21.42 to \$22.61).

Besides this, these employees receive mileage, extra compensation, as follows:

[Per kilometer.]

Between Hamburg and.....	Magdeburg.		Dresden.		Laube.	
	Pfen-nigs.	Cents.	Pfen-nigs.	Cents.	Pfen-nigs.	Cents.
Masters.....	6½	1.55	5	1.19	5	1.19
Engineers.....	4½	1.07	3½	.83	3½	.83
First mate.....	4½	1.07	3½	.83	3½	.83
Second mate.....	3½	.83	2½	.59	2½	.59
Firemen.....	{ 2	.47	1½	.30	1½	.30
Deck hands.....	{ 3½	.83	2½	.59	2½	.59
	2	.47	1½	.30	1½	.30

On certain other routes these extra wages are a trifle higher.

The wages of employees on barges are as follows: Mates (helmsmen), from 130 to 145 marks (\$30.94 to \$34.51) per month while the vessel is in service and 110 marks (\$26.18) during the winter months.

Boys on barges and steamships earn wages as follows: First year, 40 to 45 marks (\$9.52 to \$10.71) per month; second year, 45 to 50 marks (\$10.71 to \$11.90) per month; third year, 55 to 60 marks (\$13.09 to \$14.28) per month; fourth year, 65 to 70 marks (\$15.47 to \$16.66) per month, with a slight extra compensation for mileage on certain routes.

Employees on barges or other towed vessels receive no extra compensation for mileage.

Many private barge owners attend to the navigation of their vessels personally, with the assistance of their wives, children, and often of other relatives as well, who in such cases frequently do not receive a fixed rate of wages, but a share in the profits.

RIVERS AND CANALS IN THE CONSULAR DISTRICT OF MAGDEBURG.

Report by JAMES L. A. BURRELL, *Vice Consul.*

I. PUBLIC SUPERVISION.

(a) The supervision over the navigable streams and canals in Prussia is in the hands of the State; in the Kingdom of Saxony, the Duchy of Anhalt, the State of Hamburg, and the Grand Duchies of Mecklenburg, which are watered by the Elbe or its tributaries, the supervision is exercised partially by special administrative bodies under the respective governments, and partially by the General Government itself.

In Prussia a uniform organization has been created for the Elbe and Saale Rivers, as well as for their tributary streams for fixed distances, in the Royal Elbstrombauverwaltung (administration of the Elbe stream), at the head of which is the Oberpræsident (roughly, provincial governor) of the Province of Saxony in Magdeburg as chief. Under the Elbstrombauverwaltung are seven water inspectorships (Wasserbauinspektionen)—two in Magdeburg, one of which supervises the lower Saale, and one each in Torgau, Tangermünde, Wittenberge, Hitzacker, and Lauenburg.

(b) 1. The official bodies have allowed private capital to utilize navigation for commerce, and have neither a direct nor indirect influence on the capitalization of navigation corporations.

2. For this reason reports of operation are not issued by the official bodies. The private corporations report at the close of the year on the extent of business done for the benefit of the stockholders, who make public as much of this information as they think best. (See below, under II (b).)

For a number of years statistics of water-borne traffic were collected at the various terminals and sent to the statistical bureau (Statistisches Amt) in Berlin for compilation and publication. But in spite of voluminous and difficult work, a perspicuous and accurate view could not be obtained. Accordingly a new system was introduced at the beginning of the year 1909, in the furtherance of which the cooperation of the navigation companies was counted upon. This system failed on account of the unreliability and refusal of the special assistance expected, so that no official statistics for the year 1909 will be compiled.

The regulation of the freight rates is wholly the affair of the navigation companies concerned.

II. WATERWAY IMPROVEMENTS.

(a) Formerly the various States and official bodies collected taxes for the use of the waterways and only irregularly and in case of great need made appropriations for their maintenance and improvement. But in the course of time the activity of the State in the improvement of the waterways increased and the tolls, etc., decreased, particularly as it became necessary to compete with the railroads, until finally in 1870 all tolls and duties on the natural waterways (rivers) were abolished.

In spite of the appropriations, in some cases very large, which the State made from time to time, the conditions were still far from being satisfactory, and the Prussian Government established, therefore, in 1866 the Elbstrombauverwaltung mentioned above. From this time, with the aid of adequate appropriations, a regular and systematic method of river improvement began, which has proven extraordinarily satisfactory, owing largely to the expert and farsighted distribution of the funds at its disposal by the central authority.

The improvements made may be classed as follows: "Coupierungen" (cuttings, the removal of impeding tongues of land, etc.), "Buhnen" (tongues of land built out into the stream in order to make a channel of even width in flat country), "Deck-und Parallelwerke" (built in case of sharp bends, particularly such with receding banks), "Grundschwellen" (subaqueous constructions to prevent any washing out of and to give support to the "Buhnen"), and "Baggerungen" (dredgings). The land washed up between the constructions on the banks was planted and strengthened, thus serving on the one hand to make the banks more secure and on the other furnishing material for the corrective constructions. The lines of correction established by the stream improvement commission (Strombaukommission) appointed for the purpose were built out systematically with due consideration of local conditions, and permanent shoals and temporary deposits were removed. The winter harbors already in existence were enlarged and improved and new ones constructed. An organized river police was established and a careful marking of the changeable channel was introduced, by means of which, with the aid of reports which are telegraphed and immediately published, the boatman is able to regulate the amount, respectively the weight of his cargo. Notifications of high water and of the movements of the ice warn the boatman in time of approaching danger.

The channel established by means of the various improvements mentioned above made possible an increase in the tonnage of the vessels, a reduction in the number of the crew, and a shortening of the running time. The narrowing of the channel and the decrease of the shallows exerted a favorable influence against the formation of ice floes. Such improvements were made for the Saale and Unstrut, as well as for the Elbe, except that the construction of locks was necessary in the two rivers just mentioned.

(b) The improvements mentioned in the foregoing have also been made in other navigable rivers and in all cases at the expense of the State.

Expenses incurred for the benefit of inland navigation on the Elbe were as follows:

Cost of the various improvements made during the last 40 years:

Expended by Prussia	\$8, 234, 800
Expended by Anhalt and Mecklenburg	2, 070, 600
	10, 305, 400

Running expenses, i. e.; cost of maintenance, being the average annual expenses during the last ten years:

Prussia	\$333, 200
Anhalt and Mecklenburg	34, 510
	367, 710

Navigation on the Elbe is free.

By far the greater part of the harbors on the Elbe are the property of the Government, and serve principally to afford protection to vessels in winter. The terminal facilities in these harbors, however, which serve the interests of commerce and industry, belong to private companies, not to municipal corporations. The commercial and trade harbor of Magdeburg belongs to and is administered by the municipality. The harbor in Aken belongs to a stock company.

The fees for the harbors on the Elbe belonging to the Government are regulated to cover the cost of maintenance. Only for such vessels as use the protecting harbors are fees (Winterliegegebühren) exacted, and, in case goods are stored, there are also fees for storage (Ufergeld). The amount of the fees is different in the different harbors, corresponding to the cost of construction of the latter; the fees paid at the Torgau Harbor, for instance, being three times as high as at Lauenburg.

Expenses incurred for the benefit of navigation on the Saale and Unstrut were as follows:

Cost of various improvements during the last forty years:

Prussia :	
For river improvements (Korrektionsbauten)	\$1, 225, 700
For building new locks	107, 100
Anhalt	102, 340
	1, 435, 140

Average annual cost of maintenance during the last ten years:

Prussia	\$22, 610
Anhalt	10, 710
	33, 320

Navigation on the Saale and Unstrut is not free, as the expense of the locks is considerable; lock toll, based on the tonnage of the vessels, is therefore exacted. The average yearly income during the last ten years from this source and others was as follows:

Prussia :	
Lock toll	\$5, 712
Pasture, sand and gravel, rent	952
	\$6, 664
Anhalt	1, 428
	8, 092

The most important tributary of the Elbe, not only in respect to navigation, but also owing to the amount of water it brings into the main stream, is the Havel, whose various water courses were long ago united by canals, and thus made navigable. During the last 40 years the State has enlarged and improved the already existing canals and constructed new ones, and has also built new locks and harbors.

The expenses incurred by Prussia for improvements on the Havel during the last 40 years, including lakes and canals, are:

For the channel of the Havel-----	\$3, 534, 300
Tributaries-----	666, 400
	4, 200, 700

Average annual cost of maintenance during the last ten years:

Havel-----	\$39, 032
Tributaries-----	9, 520
	48, 552

As opposed to these figures, the average amount collected annually during the last ten years in lock tolls is:

Havel-----	\$209, 440
Tributaries-----	1, 428
	210, 868

For the use of the terminal facilities, etc., on the banks, which are the property of municipalities, fees are exacted, which are so adjusted as to pay a low rate of interest on the capital invested as well as to cover the costs of maintenance.

It is further to be remarked that in the figures just given the expenses for the Spree, so far as this river is in Berlin and its immediate vicinity, are not included.

Worthy of particular mention is the Elbe-Trave Canal. This was constructed at the particular instance of the State of Lübeck, which was seriously endangered as a seaport and commercial center by the sudden growth of Hamburg and by the competition of the railroads. For these reasons a good connection with that highway of commerce, the Elbe, was of great importance to Lübeck, and although by far the greater part of the Elbe-Trave Canal is in Prussia and only a small portion in the State of Lübeck the costs were divided as follows:

Lübeck -----	\$3, 820, 852
Prussia -----	1, 642, 200
Towns on the canal-----	142, 800
	5, 605, 852

The expenses incurred for that part of the Elbe under the supervision of the Elbstrombauverwaltung in Magdeburg, both for improvement and maintenance, are given for each year from 1815 to 1908, inclusive, on page 2 of the second part of the Mitteilungen der Elbstrombauverwaltung for 1907 and 1908. In these figures are included under costs of maintenance the construction of winter harbors, the inspection of ship mills, and the purchase of vessels and dwellings for the employees of the river administration. (This was a maneuver to secure the necessary appropriations from the Prussian Diet.) The expenses given in the last column for the years 1900

and following were incurred, as experience has taught that the "Buhnen" (strips of land extending into the river to regulate the current), which are protected with stone, are much more durable and offer a better resistance than those which are strengthened by planting grass, etc., thereon.

III. FLOATING EQUIPMENT.

(a) 1 to 4. The self-propelled vessels used on the Elbe are the steamers which carry fast freight. The transportation of fast freight is, in comparison to ordinary freight, unimportant. The steamers used for fast freight are usually intended for the canals and are of moderate size.

On the Elbe and its tributaries, as well as on the canals, the barges are towed by steamers (side-wheel, chain-and-screw steamers). The size and draft of the vessels is determined by the region in which they are to be used. Each vessel is officially gauged as to its tonnage, which must be clearly marked thereon.

The number, kind, material, and tonnage of the vessels domiciled on the Elbe between the German-Austrian boundary and Hamburg for the years 1872 to 1908 are given on page 20 of the "Mitteilungen," mentioned above, while the table on page 21 shows the dimensions and tonnage of the Elbe vessels which may be considered as typical for the years 1832 to 1908.

Besides the Elbe barges there are many vessels from other waterways employed in traffic upon the river, and the dimensions and tonnage of these vessels are also given on page 21 of the pamphlet in question.

The group of the smallest vessels (up to 150 tons), which were formerly used to a large extent for transporting freight longer distances, has been found too expensive for modern transportation needs, and vessels of this type are being replaced by larger boats on larger streams, while on the unimproved smaller rivers and canals they can not compete with the railroad.

Vessels of a somewhat larger size, however (150 to 250 tons), are employed to a large extent, and their number has considerably increased during the last twenty-five years.

As will be seen from the table to which has been referred, a great many barges, viz, most of those of middle size and all the large ones, are built of iron. Barges of oak last longer than those of pine, but are correspondingly more expensive.

5. As the cost of the various types of boats depends, of course, upon the material, size, and construction, it seems advisable to state the prices of such barges as are most commonly used on the Elbe at this time.

A 1,000-ton barge of pine wood costs 30,000 marks (\$7,140) and lasts about twenty years; a barge of the same size built of oak costs 40,000 marks (\$9,520) and can be used thirty to thirty-five years; built of iron, a vessel of the same kind and size costs 55,000 marks (\$13,090) and lasts about fifty years. A 600-ton iron barge costs 35,000 marks (\$8,330) and one of the same tonnage built of wood 20,000 to 25,000 marks (\$4,760 to \$5,950).

Experience has taught that steamers to be used for towing pay best when they have engines with 1,000 horsepower. Such a steamer

with all the modern appliances, etc., costs 250,000 marks (\$59,500) and can, when the height of the water is normal, tow a train of barges which carry together 100,000 centner (11,000,000 pounds) freight from Hamburg to Magdeburg (300 kilometers, or 186 miles) in from four to five days. These vessels are used only on the Elbe and are side-wheel steamers. Typical for the tributaries and canals are screw steamers 30 meters (98 feet) long and 5 to 6 meters (16 to 19 feet) broad, which has engines of from 180 to 200 horsepower and cost 50,000 marks (\$11,900). On the Elbe such a steamer can tow barges up to 20,000 centner (2,200,000 pounds), but the amount of coal consumed is comparatively large and the length of time greater than in the case of the larger steamers described.

6. Coal oil is transported up the Elbe in specially constructed iron tank ships of from 1,200 to 1,300 tons, which go to Magdeburg and Dresden, and have special quays where they are filled and emptied by means of pumps.

Some barges are specially fitted out to transport acids.

At the instance of the Bohemian and South German breweries the Elbe shipping companies have had special barges built for the transportation of beer. These vessels are provided with ice machines and cold-storage rooms by means of which the temperature can be regulated, the advantages thus provided over transportation by rail are the following: A quiet carriage without any shaking, such as is impossible on the railroad; an even temperature, which is necessary, if the beer is to retain its excellence, and saving of freight costs.

Worthy of mention are, further, the barges which are used to transport fruit to Berlin from Bohemia. These are built of good wood in Bohemia and are sent with a full cargo to Berlin, where their destiny is fulfilled, as they are then taken apart and the wood sold for building purposes. The amount thus realized covers at least the costs of material and labor.

In 1863 chain navigation (the tugs being drawn along a chain in the river) was introduced and, in course of time, various companies utilizing paddle-wheel steamers for towing came into existence. For a great many years efforts were made to consolidate the two largest German companies, the "Kette" and the "Vereinigte Elbe und Saaleschiffe," which finally led to success in 1904, when the "Vereinigte Elbschiffahrts-Gesellschaften" was formed. This new corporation began operations January 1, 1904, with a share capital of \$2,618,000. The company had at its disposal 33 chain steamers, 19 express steamers (for fast freight), 23 smaller-sized harbor steam-boats, and 308 large and 183 small barges. The number of hands employed on these vessels was 2,242.

In February, 1904, various independent companies along the Elbe formed an association based on an equal division of profits and expenses under the name of "Privatschiffer-Transport-Genossenschaft, G. m. b. H. (limited). Sitz in Magdeburg (main office in Magdeburg)." The objects of this association were to attend to (1) the freight transportation business at the stations along the Elbe and its tributaries, (2) to secure impartial treatment in the loading of the ships of its members in regular order, (3) the fixing of rates for the transportation of freight on the Elbe and its tributaries, (4) an equal distribution of the expenses of management among its members, according to the number of shares owned.

The transportation association developed favorably. In the spring of 1905 it had 1,100 members and, in round numbers, 1,200 vessels, with a capacity of 700,000 tons and valued at \$5,950,000 to \$6,188,000. In order to be always sure of having the steam power requisite for towing their vessels the association acquired in the course of time the majority of the shares of the "Deutsch-Oesterreichischen-Dampfschiffahrts-Aktiengesellschaft," and also succeeded in paving the way for a more intimate cooperation with the "Elbe-Dampfschiffahrts-Aktiengesellschaft."

Thus there were at the close of 1906 two powerful organizations in competition for the through water-borne traffic of the Elbe, viz, the "Vereinigte Elbe-Schifffahrtsgesellschaft," connected with the "Oesterreichische Nord-West-Dampfschiff-Gesellschaft," on the one side, and the "Privatschiffer-Transport-Genossenschaft," combined with the "Deutsch-Oesterreichische Gesellschaft," on the other.

When the association first mentioned was founded, viz, January 1, 1904, its aim was to put the enterprise on a better paying basis, and this may be considered as having been accomplished. Its further endeavors were bent on steadyng the rates and keeping them, by economical management, at such a reasonable height that commerce and traffic would not be unfavorably affected.

The association did not accomplish this object, nor was it possible to do so as long as another association, as powerful as itself and operating independently, was in existence. The negotiations carried on in 1907 for the purpose of closely uniting these two influential associations led to a combination covering all the floating stock of the Privatschiffer-Transport-Genossenschaft, the Deutsch-Oesterreichische Dampfschiffahrts-Gesellschaft and the Elbe Dampfschiff-Gesellschaft. The contract went into effect July 1, 1907, and, being merely provisional, its duration is short, as it expires at the close of 1916. This corporation has at its disposal a fleet of vessels consisting of 30 chain steamers, 71 paddle-wheel tugs fitted out with engines having from 250 to 1,200 horsepower. 3 back-wheel steamers, 19 express steamers (170 to 250 horsepower), 37 screw steamers, 419 barges of its own having a tonnage of from 200 to 1,300 tons. 700 hired barges, and 235 lighters.

The freighters regarded this combination of the five powerful companies with distrust, for they expected higher rates for freight and towing. These fears, however, were soon dispelled, not only by the fact that even after this union had taken place there was still a considerable number of steamers and barges—outsiders—on hand, but also by the founding of a new enterprise. As early as 1907 the "Neue Deutsch-Böhmishe Elbe-Schiffahrts-Aktiengesellschaft," with a capital of \$714,000, was formed under the supervision of the Magdeburger Privat-Bank of this city (now Mitteldeutsche Privat-Bank), and began operations in the autumn of 1907. At the present time this company has at its command 14 tugs, total horsepower 8,500; 57 barges of its own, and 70 that are hired.

The following companies also operate on the Elbe: The "Neue Norddeutsche Flussdampfschiff-Gesellschaft," in Hamburg, 9 steamers; "Schlesische Dampfer Compagnie Aktien-Gesellschaft," in Breslau, 10 steamers; Mathias Burmeister, Lauenburg, 6 steamers; further, about 50 smaller companies, with from 1 to 2 steamers each.

The steamboat traffic on the Oder and on the canals and streams between the Oder and the Elbe is mostly in the hands of private contractors of no great means, and their business is confined to fixed distances, for instance: Dampfschiff-Reederei Franz Ferum, from Berlin to the mouth of the Havel, 8 steamers; Emanuel Friedländer, Breslau, mainly Oder territory, 7 steamers; Lueders & Stange, Magdeburg, from Magdeburg to Lübeck, 6 steamers. Besides these, there are many other shipowners having but a few steamers each.

During times of business prosperity as many as 350 steamers, with 107,000 horsepower, have plied on the German Elbe exclusive of that part belonging to the harbor of Hamburg. In 1866, when the Elbstrombauverwaltung was established, there were only 18 steamers, with 2,900 horsepower.

8. The construction of the barges is such that they can float fully loaded when the river is at its normal height; at less favorable times they are freighted according to the depth of the water. The following is a typical instance: Last year during a period of low water vessels having a capacity of 1,000 tons could not carry more than 100 tons. The decks of the barges are built as low as possible in order to enable them to pass under the bridges when the water is high. When these Elbe barges are loaded to their utmost capacity the lowest part of their sides is only six to eight inches above the surface of the water.

IV. OWNERSHIP OF VESSELS AND BUSINESS ORGANIZATION.

(a) As stated above, canal construction and waterway improvements have been carried on only by the State, assisted slightly at times by the communities bordering on the streams in question. The Government has no vessels for business purposes, but it does own steamers, barges, dredging machines, scows, ice-breakers, and the like; in short, vessels that serve the purpose of facilitating traffic, keeping the waterways in good condition, and removing obstacles. There is, however, an exception to this rule. Beginning with 1900 the Lübeck government has conducted the towing business on the Elbe-Trave Canal, having as its object an economical management of the locks and machinery therewith connected and the keeping down of the costs of maintenance in general; further, for the purpose of keeping the vessels running regularly, to make possible low rates for towing, and to keep these fixed as far as possible, and to put an end to the trips of vessels having no cargoes. The construction of the canal is such that it permits of towing along the shore by means of electricity, but as it does not promise to be profitable this towing plant has not yet been used. Self-propelled vessels—express steamers, steam barges, and the like—are not dependent upon the Government for towing.

(b) Answered above under III (a) (7).

(c) The Government owns nearly all the railroads, but it does not possess freight vessels. Neither have the railroads owned by private parties anything to do with freight traffic on the waterways.

Of the private producing and distributing concerns owning and operating vessels may be mentioned the following: Deutsch-Amerikanische Petroleum-Gesellschaft, which has its own barges; the Saccharin-Fabrik, Westerhuesen, which has a few barges for acids; and various associations of coal dealers possessing barges for

coal. In numbers the vessels owned by such concerns and by private parties when taken together do not admit of comparison with the fleets of the great shipping combinations treated above.

- (d) No.
- (e) Answered above under III (a) (7).

V. TERMINAL FACILITIES.

(a) At those places having the largest amount of traffic the steamship companies own shipyards for the building of new barges and the repair of old ones. Their docks are situated in the harbors of the seaward towns, as Hamburg, Lübeck, and Stettin, and are only intended for the use of large-sized river steamers.

(b) The facilities of the harbor at Magdeburg-Neustadt may serve as an example of the modern methods of loading and unloading vessels. There is a basin in the harbor of 672,750 square feet (62,500 square meters) in extent, with about 1,800 meters (5,905.50 feet) quayage. This is surrounded by large warehouses intended for goods which are not conveyed further by rail or wagon. These goods are lifted up by means of electric windlasses and are put directly into the warehouses. There are 19 hoisting machines for loading and unloading vessels of all kinds located around the basin. These include 11 movable hydraulic (portal) derricks, 4 movable electric (portal) derricks, 4 movable (portal) steam derricks. There is a large space of ground with flat banks for cargoes which may be unloaded more readily by being carried by hand or in wheelbarrows, for instance, wood and stone. Goods in masses, such as fertilizing salt, which is conveyed in a loose state run through a contrivance consisting of a box and a connecting tube from the railroad car directly into the barge and there is no loss of weight whatsoever.

(c) The older harbors have been modernized as far as possible, and have been provided with tracks connecting with those of the railroad; the modern harbors have without exception tracks connecting immediately with the railroad. Magdeburg may be taken as an example of how a terminus is (d) connected with the railroad. In this city only the termini situated on the left side of the Elbe could be connected therewith, on which side of the river there are seven large companies handling the transshipping of freight and each terminal is connected with the Elbe freight station. Three of these termini belong to private parties, three are the property of the city, two thereof being leased to private parties, and the third being the harbor Magdeburg-Neustadt, managed by the city, as already mentioned. The third terminus is the property of the railroad, i. e., the Government. The tracks reaching to the banks of the river are the property of the termini with which they are immediately connected. The railroad receives fees (*überführungsgebühr*) for bringing its cars from the station, the amount depending on the distance the cars are run.

- (e) Such a list does not exist.

VI. TOLLS AND FREIGHT RATES.

(a) Navigation on the main streams and tributaries for which, comparatively speaking, no very heavy expenses were incurred is

free of charge. On the streams and canals with locks, so-called Schleusengelder (lock tolls) are collected. As these fees are adjusted so as to cover operating expenses they vary considerably, in very few instances yielding a surplus to pay interest on the capital invested. On canalized rivers such fees are also collected.

(b) The rates for towing are established by the navigation companies, and they depend upon the number of barges to be towed. High water causes high rates, as the current is more rapid and the consumption of coal greater than usual. There are no special tariffs, as the rates frequently change from day to day. Under ordinary conditions of business and with the river at a normal height it costs \$214.20 to tow a barge carrying 20,000 centner (2,200,000 pounds) from Hamburg to Magdeburg, a distance of 186 miles, or 0.952 to 1.1 cents per 110 pounds, but unfavorable conditions often double this rate. The navigation companies own both steamers and barges, hence the towing charges are established by the same management. In time of great business activity the companies tow their own empty barges down the river in order to use them again as soon as possible, whereas under ordinary conditions they are allowed to drift with the current.

(c) The freight rates on the Elbe, which, as has been stated, are continually subject to fluctuation, are calculated according to classes.

First class: Coal, salt, ore, stone, and other heavy goods in bulk.

Second class: Grain, oils, sugar, etc.

Third class: Ordinary piece goods.

Fourth class: Piece goods which require more careful handling, such as machines, etc.

The first class is cheapest, and the rates generally increase 2.1 cents per 220 pounds with each class, but at times the increase is higher.

The chief cause which determines these fluctuations in freight rates is the height of the water in the river. In summer the river is usually very low and the barges can carry but very small cargoes, causing a scarcity of barges and an advance in the freight rates.

(d) The rates increase slowly with the distance of the haul, but the increase is very moderate as long as the water is fairly high, so that the vessels can travel with full cargoes, thus preventing a scarcity of barges. As has been mentioned, there are special steamers (Eilgutdampfer) for goods requiring speedy transportation.

The fluctuation in freight rates is not so great on the canals and rivers east of the Elbe as far as the Oder. The following examples will illustrate these fluctuations.

August 12, 1909, when the water was fairly low, the following rates were paid for freight, the barges being fully loaded:

From Hamburg to—	Cents per 220 pounds.
Magdeburg (186 miles)-----	4.2 to 4.5
Schönebeck (195 miles)-----	5 to 4.8
Aken (214 miles)-----	5.5 to 5.2
Torgau (295 miles)-----	6.9
Dresden (357 miles)-----	8.8
Berlin, through the canal (186 miles)-----	6.6 to 6.1
Halle, up the Saale (258 miles)-----	8.5

With similar conditions as regards the height of the river prevailing, but with a greater quantity of goods to be transported on barges

which, on account of the comparatively low water, could not carry their full tonnage, the rates September 25, 1909, were as follows:

From Hamburg to—	Cents per 220 pounds.
Magdeburg	6.6
Schönebeck	7.1
Aken	7.3
Torgau	12.3
Dresden	13.5
Berlin	9.0
Halle	13.0

With less favorable water conditions (the cargoes of the barges had to be considerably reduced) and a plentiful supply of goods to be shipped, the freight rates November 9, 1909, were as follows:

From Hamburg to—	Cents per 220 pounds.
Magdeburg	9.5
Schönebeck	10.0
Aken	10.2
Torgau	13.8
Dresden	17.1

From Magdeburg to Hamburg the barges are floated down the river, thus there are no charges for towing. The following rates prevailed during the last few months:

	Cents per 220 pounds.
August 12, 1909	2.8
September 25, 1909	3.1
November 6, 1909	3.3

From Aussig to—	Aug. 12.	Sept. 25.	Nov. 6.
	Cents.	Cents.	Cents.
Magdeburg (248 miles).....	2.8	2.8	3.4
Hamburg (434 miles).....	3.3	3.5	4.3

The above figures are for goods in bulk of Class I. For piece goods the fluctuations are not so great, the rate for fast freight from Magdeburg to Hamburg being between 14.3 and 16.6 cents per 220 pounds and from Magdeburg to Lübeck 16.6 to 19 cents for the same quantity. The same rates apply from Hamburg and Lübeck to Magdeburg. It is further to be remarked that the figures given are the rates for carriage alone and do not include fees for transshipping, etc.

(e) Prorating between water lines and railroads does not exist for the Elbe.

(f) Water lines are able to compete with the railroad whenever great quantities of freight are to be hauled long distances. The canals are able to compete in the transportation of piece goods also, as on them only small vessels are used and loading and unloading is easier.

(g) Since the government has taken over the railroads, the "war tariffs" formerly maintained by the more powerful railroad companies were abolished; however, the Prussian Government grants such low rates for agricultural products carried by the railroad that, when the river conditions are unfavorable, they are no higher than the rates for water transportation. There are no special agreements relative to a division of the traffic; the railroad, however, concentrates a large number of empty cars at places where a large quantity of goods is expected to arrive by water, in order to be prepared to transport them further.

(h) The relations between rail and inland water systems of transportation are not subject to regulation.

There is no governmental restriction on the lowering of rail rates in competition with water rates.

In most cases the goods are insured by the navigation company at the request of the consignor and are billed separately. Large firms that ship regularly by water insure their goods by taking out a general policy from one of the regular insurance companies. Entries of the kind and amount of goods are made in a book and monthly settlements are made with the insurance companies. The amounts charged for insurance depend upon the kind of goods and the class of vessel in which they are shipped.

VII. WATER-BORNE TRAFFIC.

(a) Goods in bulk predominate in the freight traffic on the Elbe and its tributaries. The principal articles conveyed are grain, fertilizers, ores, oils, sugar, coal, etc.

(b) The following works give detailed statistics as to traffic on the Elbe, the principal commodities moved, proportion and character of traffic moved in different directions, and statistics of vessel movement and traffic:

Die Statistik des Deutschen Reiches Die Binnenschiffahrt im Jahre 1908. Verlag von Puttkammer & Muehlbrecht, Berlin.

Deutsche Wasserstrassen und Eisenbahnen in ihrer Bedeutung für den Verkehr. Gehauer-Schwetschke Druckerei & Verlag, Halle a. Saale.

Mitteilungen der Elbtsrombauverwaltung für die Elbe 1907-8. E. Bänsch jun., Magdeburg.

Eine Studie über die Elbschiffahrt. Dr. Fischer, Magdeburg, Verlag von Gustav Fischer, Jena.

(c) Package freight does not amount to over 5 per cent of the total.

The local traffic is also of little importance. Brickyards, sugar refineries, and the like, which are located far from the railroad but near to waterways, come into consideration, i. e., the water route is resorted to only where unfavorable conditions relative to the railroad exist, as navigation can not compete with the railroad unless great distances are to be covered.

(d) The hands employed on the vessels have to prove their ability for the tasks for which they are hired by passing an examination. Schools for special work, as well as continuation schools, have been established for the boatmen. The regulations in force apply particularly to captains and steersmen.

Wages paid per month: Crew, \$26; steersmen, \$38; captains, \$43 to \$48.

The latter also receive mileage money, i. e., an extra compensation, determined by the distance traveled.

The workmen at the termini do chiefly piecework, very few being engaged at fixed wages.

Besides the works mentioned in the body of the report, the following works were consulted:

Zeitschrift für Binnenschiffahrt. Berlin, 1907.

Conrads Jahrbücher, Jahrgang, 1903.

Die Deutschen Ströme von Meidinger. Leipzig.

Der Elbe-Trave Canal. Denkschrift, 1900.

Mitteilungen der Vereinigten Elbschiffahrts-Gesellschaften. Dresden, 1907.

Führer auf den Deutschen Schiffahrtsstrassen. Berlin, 1905.

Schiffahrtskalender 1908 für das Elbe-Gebiet, Paul Grimm. Dresden.

RIVERS AND CANALS IN THE AMERICAN CONSULAR DISTRICT OF BREMEN, GERMANY.

Report by WILLIAM THOMAS FEE, *Consul.*

The territory of this consulate is traversed by the river Weser and its tributaries. It is a tide-water stream as far inland as the city of Bremen, and forms a connecting link with that city and the sea, a distance of some 42 miles, and has been made navigable for the ordinary seagoing craft up to 20 feet or more draft. The upper Weser is navigable for small river boats as far as the city of Cassel, about 200 miles to the southward.

I. SUPERVISION.

The public supervision of the river Weser is under the jurisdiction of the States bordering its banks, namely, the Kingdom of Prussia, the Grand Duchy of Oldenburg, and the free State of Bremen.

The official duties of the Governments of these three States are, police supervision and maintenance and improvement of waterways, as provided by law.

The States do not control the river freight rates or traffic, which are entirely in the hands of private corporations and private persons.

The collection of statistics of water-borne traffic are compiled and published in Bremen by the Bremisches Statistisches Amt. To meet the expenses of this office a "declaration tax" is levied on the value of the freight shipped, either by rail or waterway, which amounts to 1 pfennig (0.238 cent) for each 66 $\frac{2}{3}$ marks (\$15.71). The shipper is compelled to sign a declaration giving the number of packages, the name of the goods, the country or place of origin, the net and gross weights or other measurement of goods, and the value of the goods.

II. WATERWAY IMPROVEMENTS.

Hitherto there has not been any established policy as to water power developed by works constructed for improving navigation. At present, however, the State of Bremen is constructing a storage dam near the village of Hemelingen, about 5 kilometers east of Bremen, which will be provided with turbines. This plant when finished will have 16 turbines of 600 to 1,000 horsepower each; the maximum capacity will be from twelve to thirteen thousand horsepower. For the present only five turbines are planned to be finished, but the foundation and pillars for all 16 turbines will now be constructed. The turbines have vertical shafts, at the prolongation of which dynamo machines are posted. The power thus generated will

be used by the electric works of the city of Bremen. The dam itself will not be completed until the middle of next year; its construction is like that of the dam at Lockport, Ill. Besides the turbines, it will be equipped with a fishway and with two locks measuring 350 by 12.5 meters and 70 by 12.5 meters, respectively. The two chamber locks are separated from each other by a wall 7 meters in breadth and 10 meters in height. This wall contains two large hollow spaces, the lower one of which is constantly connected with the low-water level. The foundations of the heads of the locks are constructed out of beton and iron, strong enough to resist the heaviest pressure of the underground water.

The opening of the locks, and the closing, is done automatically by an ingenious device, which is called "System Nyholm," and which utilizes directly the fall of the river without the aid of power machines. A report on this system was sent to the Department of State on July 17, 1908. The total costs of construction of the dam and its equipments are calculated to be about 8,000,000 marks (\$1,904,000).

The main object of building this dam is to raise the water level of the upper course of the river Weser, which had been lowered so much by the deepening of the navigable channel on the lower course of the river as to cause damage to the adjoining farming country. River navigation will naturally profit greatly by it.

All improvements of waterways are made by the State bordering the river, or by a combination of those States that are benefited by such improvement.

On the lower course of the river Weser, from the mouth of the river (Red Sand Lighthouse) to the free harbor at Bremen, a distance of 112.4 kilometers, the navigable channel has been deepened at an expense of 33,661,710 marks (\$8,011,487), which was paid by the city of Bremen. By this improvement the following depths of the river bottom were established, the measures being given below Bremen zero, which lies 2.28 meters, or 7.48 feet, above the level of the North Sea:

At Bremen (free harbor), 4 kilometers from the Weser bridge, 6.5 meters Bremen zero, or 6.2 meters below average high tide, or 4.6 meters below average ebb tide.

At the town of Vegesack, 17.5 kilometers from the Weser bridge at Bremen, 7.2 meters Bremen zero, or 6.6 meters below average high tide, or 4.5 below average ebb tide.

At Farge, 26 kilometers distance from Bremen, 7.7 meters Bremen zero, or 7.1 meters below average flood tide, or 4.6 meters below average ebb tide.

At the mouth of the river Hunte, 32.5 kilometers from Bremen, 8.4 meters Bremen zero, or 7.8 meters below average flood tide, or 4.9 meters below average ebb tide.

At Brake, 40.6 kilometers from Bremen, 8.8 Bremen zero, or 8.2 meters below average flood tide, or 5.1 meters below average ebb tide.

At the mouth of the river Geeste, 65.5 kilometers from Bremen, 10 meters Bremen zero, or 9.3 meters below average flood tide, or 5.9 meters below average ebb tide.

The width of the navigable channel of the river Weser is as follows: Between Bremen (free harbor) and Vegesack, from 70 to 80 meters; between Vegesack and the mouth of the river Hunte, 100

meters; between the mouth of the river Hunte and Brake, 120 meters; between Brake and the mouth of the river Geeste, 140 to 150 meters.

The harbors for the large trans-Atlantic liners and other deep-sea craft are at Bremerhaven. They are:

Name.	Date of construction.	Length.	Breadth.	Length of quays.
		Meters.	Meters.	Meters.
Alter Hafen.	{1827-1831 1860-1862}	750	115	1,350
Neuer Hafen.	1847-1871	830	114	1,520
Alter Kaiserhafen.	1872-1876	600	145	—
Vergrosserter Kaiserhafen.	1892-1897	800	285	2,160

On the west side of these quays are the railway tracks, and adjoining them is a paved street, while on the east side the quays are bordered by sheds, which again, on their opposite side, adjoin the railway tracks. There are two railway freight stations in the harbor district, one on the outside and the other one inside the territory of the customs union.

The "Alter Hafen" is equipped with three hand cranes of 2.5 and 7.5 tons capacity. The "Neuer Hafen" has two hand cranes of 8 and 12.5 tons capacity, respectively, one steam crane of 45 tons, one turnable steam crane of 75 tons, and two steam cranes (system Brown-Weson) of 1.5 tons capacity each. The "Alter Kaiserhafen" has one 20-ton hand crane, one 1.5 steam crane (Brown & Wessing), and one 30-ton turning crane. The "Neuer Kaiserhafen" has one 20-ton hydraulic crane and one 150-ton giant electric crane.

In Bremerhaven there are two dry docks. The one in the "Neuer Hafen," for vessels measuring 114.20 and 138.67 meters in length, belongs to the Norddeutscher Lloyd Steamship Company, and is surrounded by repair shops.

The Kaiser dry dock, for vessels of 228 meters length, was built by the State of Bremen in the years 1895-1899, and is rented to the Norddeutscher Lloyd Steamship Company.

Adjoining Bremerhaven is the harbor of Geestemünde, on Prussian territory, and on the opposite side of the river Weser are the piers of Nordenham, which can be approached by deep seagoing vessels. Nordenham is on Oldenburg territory, as is also the harbor of Brake, which is situated about 18 kilometers upstream, and which is also well provided with loading and unloading facilities especially suited for the grain trade. The city of Bremen proper has the following harbors:

(1) Lumber and factory harbor. Area, 17.297 acres; length, 1,170 meters; breadth on average, 8 meters; depth on north side, where the factories are situated, 6.3 meters, with ample railway connections and 2,100 meters of storing space; 2 hand cranes, 4 hydraulic cranes, 4 sheds and warehouses, and 3 grain elevators.

(2) Free harbor, Basin I. Length, 2 kilometers; breadth, 120 meters; 3,700 meters loading space, with railway tracks. The harbor is equipped with 87 hydraulic cranes of 1.5, 2.4, and 10 tons capacity, one floating crane of 40 tons capacity, one loading bridge, and 22

warehouses and sheds. The one-story sheds have about 74,000 square meters of floor space, the warehouses (of three and four stories) about 124,500 square meters. The loading and unloading of vessels is done by the Bremer Lagerhaus Gesellschaft (Bremen Storage Company).

(3) Free harbor, Basin II, is similar to Basin I. Length, 1,720 meters; breadth, 100 to 110 meters. Its fore harbor measures 350 by 240 meters, and allows vessels to turn. Adjoining this is a basin measuring 275 by 800 meters for intervessel loading and unloading.

The State of Bremen has now under construction a large and new harbor at Bremerhaven and a new factory harbor at Grambke, near Bremen, which, however, will not be completed for some years to come.

For inland navigation Bremen has the following accommodation:

Weserbahnhof. Quays directly on the river Weser, 491 meters in length, of which 451 meters are occupied by storage sheds. From this point most of the freight of the trans-Atlantic liners is shipped by barge to Bremerhaven.

Hohetorshafen. Situated on the opposite or left bank of the river Weser. The area of this harbor measures 60,000 square meters, and its depth is sufficient to allow vessels of 5 meters draft to lie afloat.

III. FLOATING EQUIPMENT.

On the upper course of the river Weser stern-paddle-wheel steamers and barges are used for transportation of freight. Both are built of steel. The steamers measure 50 meters in length, 11 meters in breadth, and are equipped with engines of from 200 to 500 horsepower. Their speed is about 6 kilometers per hour. The barges measure 60 meters in length, 8.2 in breadth, and, when loaded, their draft is 1.8 meters.

The length of the tug train of boats is generally 450 meters. Statistics regarding the cost of construction of the various types of river boats are not obtainable.

IV. OWNERSHIP OF VESSELS AND BUSINESS ORGANIZATION.

Oil from the Hanover district is shipped in tank barges. River boats and barges are not owned by the State nor by the railways.

The wages paid to boat hands on the upper Weser vary from 3 marks (\$0.71) to 6 marks (\$1.42) per day.

The navigation of the Weser is in the hands of the following stock companies:

Bremer Schleppschiiffahrts-Gesellschaft—capital, M. 2,250,000 (\$535,000).

Mindener Schleppschiiffahrts-Gesellschaft—capital, M. 1,400,000 (\$117,000).

Wesermuehlen Aktiengesellschaft—capital, M. 500,000 (\$117,000).

Celler Schleppschiiffahrts-Gesellschaft—capital, M. 700,000 (\$166,600).

Several private persons—capital, M. 500,000 (\$117,000).

There are no navigation taxes levied on the upper Weser, excepting on the Fulda Channel, from Münden to Cassel, a distance of 28 kilometers, where a tax is levied on the cargo.

Combined railway and waterway freight rates do not exist.

V. TERMINAL FACILITIES.

The terminal facilities at Bremen are owned by the State, while in ports of the upper Weser such accommodations are established and maintained partly by the State, community, or by private persons.

VI. TOLLS AND FREIGHT RATES. (Omitted.)

VII. WATER-BORNE TRAFFIC.

The following table shows the ships' traffic on the upper Weser during the last 10 years:

Year.	Arrivals.		Departures.	
	Number of vessels.	Register tons.	Number of vessels.	Register tons.
1899.....	1,611	292,526	1,528	282,465
1900.....	1,714	307,324	1,674	302,609
1901.....	1,751	316,467	1,690	312,882
1902.....	1,794	325,635	1,756	329,994
1903.....	2,136	396,397	2,065	391,817
1904.....	1,893	365,121	1,872	366,625
1905.....	2,150	481,847	2,119	481,666
1906.....	2,144	541,053	2,095	534,726
1907.....	2,353	675,688	2,357	684,599
1908.....	2,270	679,360	2,216	666,850

In the arrivals are included:

Year.	Rafts.	Register tons.	Year.	Rafts.	Register tons.
1899.....	181	2,345	1904.....	28	650
1900.....	117	2,106	1905.....	32	695
1901.....	53	1,463	1906.....	24	531
1902.....	62	1,661	1907.....	25	559
1903.....	57	1,325	1908.....	22	512

RIVERS AND CANALS IN THE CONSULAR DISTRICT OF BARMEN.

Report by GEORGE EUGENE EAGER, *Consul.*

I. PUBLIC SUPERVISION.

The supreme public authority over all undertakings in the improvement of rivers or building of canals is vested in the minister of public works, head of the bureau of public works at Berlin. Each great river is divided into sections, and over each section there is appointed a so-called "schiffahrts inspector" (shipping inspector), who has supervision of his particular division. Over the entire river a specially appointed commission superintends its working and improvement.

Inspectors have nothing to do with the capitalization of projects.

The rates are made by the local harbor directors, which are forwarded to the minister of public works for his revision and approval.

It is the same way with reports. Each inspector makes his report to the river commission, who in turn forward the combined reports of the inspectors to the bureau of public works, where they are finally completed and given out by the central government.

Improvements of channels, building docks and terminal facilities must all be planned first by those interests desiring to make them. These plans are then submitted to the commission, then to the bureau of public works, which either gives or refuses its consent to their construction.

The collection of statistics as to amount of fees collected and freight handled, etc., is done by each city that possesses a harbor, railroad, or wharf. These statistics are in turn sent to the ministerium in Berlin, where they are compiled and given out by the central government.

II. WATERWAY IMPROVEMENTS.

All improvements for rivers and canals are made by the State. Harbors and terminals are usually undertaken by either cities or private corporations, which have to submit plans to be approved and passed by the minister of public works.

All improvements to rivers for navigation and all canal construction in this district have been carried on by the Prussian Government. Harbors and terminals, together with their railroad and docking facilities, have in nearly all cases been built by cities. There are, however, one or two cases where private corporations have built their own harbor and docks. There is one at Düsseldorf-Reisholz which was built by a private land improvement company, in order to attract industrial companies to the location.

III. FLOATING EQUIPMENT.

For a history of the different types of vessels used on the Rhine and the canals, with specifications, illustrations, etc., see the book *Führer durch die Ruhrhäfen* (Guide through the Ruhr Harbors).

- (1) For carrying freight.
- (2) Steam, horse, and sail power are used.
- (3) From 150 to 700 tons.
- (4) Modern vessels are mostly of iron construction.
- (5) See book referred to above.
- (6) For carrying coal, grain, sand, gravel, etc., the towboat with barges are mostly used, while for piece freight the transportation is usually done by the specially built river and sea-going steamers.
- (7) See Guide to Ruhr Harbors.
- (8) The boats are built for a depth of from 6 to 8 feet. See Guide to Ruhr Harbors.

IV. OWNERSHIP OF VESSELS AND BUSINESS ORGANIZATION.

- (a) No.
- (b) None.
- (c) None whatever.
- (d) No.
- (e) None.

V. TERMINAL FACILITIES.

(c) Railroad tracks are located on terminals of inland waterways. The railroads at terminals in the case of city harbors are usually owned and managed by the city and are constructed to connect all the different harbor basins and wharves with the incoming vessels and with the state system of railroads.

(d) Nearly all river and canal terminals are owned by the cities. None are owned by private railways.

VI. TOLLS AND FREIGHT RATES.

(a) The toll charges on canals are usually based upon the amount of capital invested, and are made as low as possible, so as to attract traffic.

(b) Different companies make rates to suit themselves, and different rates are made according to the kind and quality of freight.

(c) The Dortmund-Ems Canal have regular stable rates for different kinds of freight. River freighting companies make their own rates.

(e) No prorating arrangements exist between railroad and water lines, because the state railroads have charges fixed by the central government.

(f) There is no competition between the state railroad lines and the river and canal lines.

(g) There is no active competition between the state railroads and water lines, and no agreements for the division of traffic.

(h) There is no legislation regulating the relations between railroads and inland waterways. Each harbor and terminal arranges

its own docking and loading fees and its own railroad transportation fees to the state railroads. These tariffs are submitted to the bureau of public works, and if they do not work an injustice to some neighboring harbor or terminal are approved and allowed.

The railroads are not responsible for loss or damage to freight by transportation. The owner must insure his goods, or stand the loss by wreck or fire, himself.

This does not affect the freight rate.

VII. WATER-BORNE TRAFFIC.

(a) Incoming water-borne freight consists mostly of raw materials.

(c) The predominance of local water traffic over other traffic depends upon the amount of manufacturing and producing of the place in question.

(d) Labor conditions in all the harbors and terminals are about the same as at Neuss Harbor, described on page 116.

Conditions as to water and railroad traffic here in Germany are quite different from those in the United States, on account of the fact that every project of the kind is under complete control of the Government. No private railway or waterway can be built without the entire plans and specifications being submitted to the minister of public works, and if these plans are not approved and accepted the work may not be allowed. An illustration may be had in the following: Not long since the city of Düsseldorf asked permission of the Government to build a rapid-transit electric road between this city and München-Gladbach. It was not granted because the Government argued that there was a State railroad between the two cities, and they preferred to have a road already at hand pay rather than to allow another built that would injure the present one. The same city asked permission to build a similar road to the neighboring city of Cologne that should make a short cut and allow passengers to make the trip in 15 minutes. This was at first also refused, but a second effort has been made to prevail upon the authorities to grant the permission, but the matter is still pending.

In addition to the above answers to the circular of August 19, I desire to submit, as a part of this report, separate reports upon the Dortmund-Ems Canal and the several important inland harbors in this district.

THE DORTMUND AND EMS CANAL.

RETROSPECT.

The Dortmund-Ems Canal owes its origin to efforts continuously made since the middle of last century to connect the industrial centers of Rhineland and Westphalia by means of a waterway with eastern Prussia. The canal as it is to-day forms a part of the greater waterway which in the near future is destined to connect the river Rhine with the city of Hanover. From one of its extremes at Herne the canal is to be continued so as to form a junction with the Rhine, and from Bevergen, the other end, another extension will be

dug which will reach Hanover. As long as the Rhine and Elbe remain unconnected the Dortmund-Ems Canal by way of Emden and the North Sea forms the natural outlet for this part of Germany in its commercial relations with the outer world. Such a connection is of vast importance on account of the steadily increasing traffic of this very important industrial region. Up to the present time the railroads, in their present state of development, have been able to cope with the constantly growing freight movement, but it is extremely doubtful whether they will be able to continue to do so in the future. The area in question is a narrow strip of land between the rivers Lippe and Ruhr, extending from the Rhine to the city of Unna, and covers about 1,390 square miles. Within its limits there are 200 collieries at work, having a yearly production of 80,500,000 tons and employing 303,000 men. Assuming that shafts are sunk to a depth of 2,300 feet, there is an ample supply of coal for the next two hundred years, even allowing a considerable increase in the output, and by sinking the shaft to 3,200 feet there is enough supply for three hundred years. There are also 120 iron works in this area.

ROUTE OF THE DORTMUND-EMS CANAL.

The law sanctioning the construction of this canal was passed July 9, 1886. It fixed the starting point at the city of Dortmund, thence to Münster, Bevergen, and Papenburg. Beyond the latter place the canal follows the lower Ems, and from Oldersum a lateral canal leads to Emden, completing the route. The distance from Dortmund to Emden via canal is 168 miles. The object of the lateral canal was to avoid the widening estuary of the Ems above Emden, where navigation for canal boats is unsafe. There is also a branch canal which connects Herne with the main canal at Henrichenburg, and is 7 miles in length.

The summit level of the canal at Dortmund is 230 feet above zero at Emden. The first section is $9\frac{1}{2}$ miles to the ship elevator at Henrichenburg, which makes connection with the main canal and lower the boats 46 feet, or 184 feet above zero. The second section, from Herne to Münster, is $41\frac{2}{3}$ miles long. At the latter place there is a lock with a fall of $20\frac{1}{3}$ feet, which connects with the so-called "Midland reach," which extends from Münster to Bevergen, a distance of 23 miles. This level is 164 feet above zero and it is from the end of this section that the proposed canal to Hanover and eventually to the river Elbe will be built. This new extension, when finished, will connect Münster with Hanover, a distance of $130\frac{1}{2}$ miles, without a single lock. From the Midland section the canal descends to the Ems by locks, with falls varying from 11 to $13\frac{1}{2}$ feet, the last lock leading into the river at Gleesen; it has a fall of $20\frac{1}{3}$ feet and is built with side basins, the same as the locks at Münster. Up to this point all locks have an available length of 220 feet, the entrances are $28\frac{1}{2}$ feet wide, and the depth of water on the sill is 10 feet.

Beyond the Gleesen locks the canal follows the river Ems for about a mile, where by means of a regulating lock it enters the former Haneken Canal. Below this junction all locks in the canal and in the canalized Ems have a length of $541\frac{1}{3}$ feet and an entrance width

of 33 feet. There are four locks on the Haneken Canal and five open on the Ems between Meppen and Herbrum, $133\frac{1}{2}$ miles from Dortmund. Below Herbrum to Emden there is a sufficient width and depth in the river to accommodate canal-boat traffic, and here the open Ems is utilized for a distance of 28 miles.

In order to descend from the summit level to the main section of the canal it was at first planned to establish a series of locks following the fall of the Emscher Valley; but this idea had to be abandoned on account of not having a sufficient supply of water available at the highest point for locking. The water of the Emscher could not be used, as it was too foul, being polluted by the sewage of Dortmund and by the water pumped into it from numerous coal mines.

The canal crosses the watershed between the Emscher and the Lippe Valleys in a cut 33 feet deep to canal bottom, across the Lippe Valley on a raised embankment, with towpath that is $44\frac{1}{2}$ feet above the ground level. The river Lippe is crossed on a stone aqueduct having three spans of 69 feet each. Crossing the watershed of the Lippe and Stever Valleys necessitated a cut $39\frac{1}{2}$ feet deep, and the embankment that crosses the Stever Valley is of the same height. The river Stever is crossed by another aqueduct, having three spans of 41 feet each, situated $1\frac{1}{3}$ miles below Münster; the river Ems is crossed on a massive aqueduct having four spans of $41\frac{1}{3}$ feet each. The canal has to overcome the greatest difference in levels within the drainage area of the Ems at a point near Riesenbeck, where it passes through a cut 41 feet deep. Beyond the lock at Bergeshoevde the country descends rapidly, so that the sections, from lock to lock, do not exceed more than $5\frac{1}{2}$ miles in length. Such short reaches between locks, however, are not to be recommended. In the present example, the headway from the water to the soffit of a bridge crossing over the canal has been fixed $13\frac{1}{2}$ feet, but it is intended to increase to 15 feet. The water level above the regulating gates on the Haneken Canal is kept down by a massive overflow weir giving free fall.

In the upper four reaches of the Ems, between Meppen and Herbrum, the water is dammed by needle weirs. At Herbrum sluices were considered necessary, as under certain conditions the water below the sluices can rise to a greater height than below. There are in all 20 locks in the canal.

DIMENSIONS OF CANAL.

The canal has a depth of 8 feet $2\frac{1}{2}$ inches, and the width of the canal at the bottom is $59\frac{1}{2}$ feet. Dimensions fixed for future Prussian canals are not essentially different. The area of the standard wet cross section is $639\frac{1}{4}$ square feet.

EARTHWORKS AND PROTECTING SLOPES.

Originally it was not thought necessary to face the slopes throughout, but during the course of construction it was discovered that the material for forming the slopes was in most cases of a sandy nature, and not compact enough to resist the wash of passing vessels.

CANAL ELEVATOR, LOCKS AND BRIDGES, ETC.

It is not proposed to give a minute description of the various structures along the entire canal, but will suffice to allude briefly to some of them that are novel in construction. Any person desiring more detailed information is referred to a series of articles published in the *Zeitschrift für Bauwesen*, Ernst & Korn, Berlin.

CANAL ELEVATOR.

The most important structure on the canal is unquestionably the elevator at Henrichenburg, which serves to overcome a fall of 36 feet between the Dortmund and main sections, capable of accommodating vessels to 950 tons, having a length of 220 feet, 27 feet beam, and a draft of 6 feet 7 inches. All previously constructed elevators for similar purposes were of much smaller dimensions. The oldest structure of this kind is the Anderlon elevator for raising vessels of 150 tons and that of La Louviere, completed several years ago, for 360-ton boats. The system of construction chosen may be described briefly as a floating lift. The substructure consists of five contiguous wells, each 30 feet 2 inches in diameter and 98½ feet deep. No difficulty was found in sinking these wells to this great depth, as hard marl of great depth was fortunately found at this point with very few fissures. In each well floats a hollow cylinder or buoy 27½ feet in diameter and 32½ feet high.

Each float, when immersed entirely under water, has a lifting power of 620 tons, so that the five cylinders together exert an upward pressure of 3,100 tons, which is equivalent to the weight of the trough, when full of water, plus the weight of the five vertical supports upon which it rests. The trough is suspended by five vertical bands in a kind of cradle, which in its turn rests on the five lattice-work supports carried by the floating hollow cylinders. The whole construction, including hollow cylinders, vertical supports, and the tank or trough filled with water, are in perfect equilibrium, so that if any extra water is admitted the trough begins to sink, or if any water is abstracted, the trough begins to rise. In order to control the movement both up and down, to start the lift at the proper moment, to stop it at any time, or to check the momentum at the end of rise or fall, and to hold the cylinders true, four massive vertical spindles are turned by shafting acting on all four spindles simultaneously, causing them to revolve at a uniform speed. Both ends of the trough and both fixed shore ends of the canal are fitted with water-tight gates.

The time occupied in raising one barge and lowering another averages twenty-five minutes. The actual time of raising or lowering the elevator trough is two and one-half minutes. The gates can only be lifted if the trough is in the exact position, otherwise the gear is locked. Neither can the trough be moved unless the gates are closed. The ends of the gates are beveled to form a joint with similar surfaces at the level. These surfaces form a frame round the trough and the level being rubber jointed they make a water-tight connection of the trough to the level as soon as the oblique ends of the trough, in its ascent or descent, coincide with the oblique ends of the level. The oblique surfaces of the canal level are fitted to a movable frame,

which can be adjusted according to the height of the water levels. Inside the frame between the two water gates there is a small space, which before the gates are lifted can be filled with water through a sluice valve in the gate of the level. On lifting the gates the same water pressure exists on both sides and the gates can be easily lifted, as their weight is for the most part balanced by counterweights.

Screw spindles 80 feet in length and having an outside diameter of 11 inches are driven by an electric motor, as are the other movements of the elevator, such as the lifting devices for the lift gates at the divisions of the trough levels and the capstan for working the vessels in and out of the trough. The electric power is supplied from a special power plant erected adjacent to the elevator.

OPERATION OF THE ELEVATOR.

The operation of a transfer is as follows: If, for example, the vessel is to be transferred from the higher to the lower level, the first operation is to effect by a crank the unbarring and the uncoupling of the gates, also the filling of the space between the two gates inside the frame between the trough and the level. Then, by moving a handwheel, the motor of the guard is started and the gates are lifted 22.9 feet.

The bottoms of the gates are raised $16\frac{1}{2}$ feet above the water. The vessel may now enter the trough. If the vessel is not self-propelled, the capstan rope is passed to the vessel and the entry completed. The gates are lowered by a slight turn of the handwheel, after which the doors are uncoupled by means of the crank movement, the level door unbarred and the sluice door closed. These operations are easily executed by two crank movements, and require only one attendant for each of the capstans. The capstan ropes are secured and released by the crew of the vessel. The attendant will then proceed to the trough and the guard attendant gives the starting signal to the attendant of the spindle motor, who by a simple lever movement starts the trough.

The trough then descends by the spindle gear toward the lower level, where it is pressed by the gear against the jointing, while the movement of the spindle automatically ceases at the same time the unbarring of the gates commences. The attendant, who has descended with the trough, has in the meantime proceeded to the other end of same, and from there goes to the lower level, which has now been reached, and carries out with the hand cranks the same operation as at the upper level. The gates are unbarred, coupled and lifted, and the ship steams out of the trough, or is hauled out by the capstan.

A second vessel can then enter the trough, the gates are shut, the trough ascends to the higher level and so on. If the vessel is self-propelled, it enters with its own power, which saves considerable time. A passenger steamer, for instance, can be transferred from one level to the other in from four to five minutes. It has at the same time performed from 500 to 650 feet of its journey. In the case of the heaviest vessels, not self-propelled, which have to be hauled in and out by the capstan, about twelve minutes are required for the transfer from one level to the other.

The elevator has thus far worked without any hitch. It even behaved extremely well on one occasion when, by accident, the trough

ran dry during a downward journey, and the apparatus had to act under conditions for which it was never intended. Experiments made with the elevator have given very favorable satisfaction. In twenty-one working days of eight to ten hours each it was possible to effect 600 single transfers. Fifty successive double transfers required no more than twenty-four minutes each, in which time one transfer up and one down were made.

The total cost of the immense undertaking was about 2,500,000 marks (\$595,000), a relatively low price. The working expenses for a transfer amount on an average to about 2 to 3 marks. This elevator which has alone overcome the whole difficulty of the higher level, has worked without interruption or breakdown since 1899. It was built by the firm of Haniel & Lueg, of Düsseldorf, Germany.

The great aqueducts upon which the canal is carried across the Lippe, Stever, and Ems, are constructed entirely of masonry, forming noble-looking structures, which are well worthy of being studied by engineers in detail.

BRIDGES.

There are 185 bridges that cross the channels. Two of these are swing bridges and the others are fixed girder bridges, giving a headway of nearly 16 feet above the highest navigable water level. The square span of the bridges was fixed at $101\frac{2}{3}$ feet, in consequence of which the cross section of the canal is contracted at the bridges. In the long run it was found preferable to increase the spans of the bridges sufficiently so as not to contract at all the cross section of the canal.

LOCKS.

Among these, two deserve particular attention, namely, those at Münster and Gleesen, each with a fall of 20 feet 4 inches. Both locks have side reservoirs, in order to economize the water required for locking and to keep this quantity down approximately in proportion to that required for working all the other locks, regardless of their higher falls. The filling and emptying of the locks is effected by culverts, one on either side, formed in the side walls of the lock and each having a sectional area of $38\frac{3}{4}$ square feet. Each culvert is connected with the lock chamber by seven pipes. Communication between the side reservoirs and culvert is made by cylindrical valves of 6 feet diameter. The connection between the culvert and the high or low-level reach can be shut off by sluice gates working on rollers. The average time required for passing a barge through a short lock is sixteen minutes. On an average, about thirty minutes are required to pass a train of barges through one of the long locks, including in both cases the time taken in getting in and out of the lock.

WEIRS AND SLUICES.

In the canalized Ems the water is held up in four deep-water reaches by needle weirs. At Herbrum there is a set of six sluices of 28 feet span each. These are necessary owing to the need of making provision for shutting out the water in the lower reach, which occasionally rises higher than the water level in the upper reach. The sluices work on rows of rollers in a manner similar to that adopted on the Manchester Ship Canal.

STOP GATES.

For the purpose of dividing the canal into isolated reaches, stop gates of an entirely novel construction have been adopted. It was considered necessary to introduce such gates, because every embankment of any great height, leading through a valley, forms a constant source of danger. Each stop gate is closed by an attendant who lives on the spot and whose business is to close the gate immediately on receiving a warning signal.

WATER SUPPLY FOR THE CANAL.

In calculating the quantity of water required for feeding the canal, it was assumed that the loss of water through evaporation and percolation would amount to 2.83 gallons per second per mile. At the outset, after the canal had been open for traffic, this loss was found to be 3.68 gallons, or 343 gallons for every $93\frac{1}{2}$ miles of canal. To this quantity had to be added the amount lost through locking at the end of the lock. The total amount thus required for replenishing the canal is supplied by a pumping station on the banks of the river Lippe, where the feed water has to be raised to a height of $51\frac{1}{2}$ feet. At the present time there are four centrifugal pumps driven by steam power, each pump being capable of raising 194 gallons per second. Each pump is driven by a 400-horsepower engine. Besides the water supplied by pumps, the canal is also fed by natural water courses. The summit reach is fed from the main reach by two pumps, each of which can raise 55.3 gallons per second. On an average during the summer months, the water lost from the canal through evaporation and percolation amounts to a depth of 1.063 inches daily. The greatest total loss by evaporation amounts to $8\frac{4}{5}$ inches during the month of August; that is, three-tenths of an inch per day.

CANAL PORTS.

There are several ports and many wharves along the canal for the interchange of traffic. Large harbors are situated at Dortmund and at Emden. The wharves are formed by widening out the canal on one side of the points in question by about 33 feet for one or more ship lengths.

COST.

The work was begun in 1893, and on the 11th of August the canal was opened for business by the German Emperor.

Purchase of land-----	\$1, 951, 600
Earthworks and slopes-----	5, 569, 200
Locks, bridges, etc-----	5, 426, 400
Subsidiary works, ports, etc-----	1, 261, 400
Reservoirs, pumps, etc-----	261, 800
Engineering, etc-----	1, 618, 400
General expenses and unforeseen contingencies-----	2, 499, 000
Maintenance during construction-----	309, 400
 Total -----	 18, 897, 200

The above sum is the cost for $156\frac{2}{3}$ miles, or about \$121,662 per mile.

The entire canal with its appurtenances was built at the expense of the State of Prussia.

DORTMUND HARBOR.

Ground was broken for the Dortmund Harbor on the 9th of October, 1895, with appropriate ceremonies, and the harbor was finished and opened for business by the German Emperor at the same time as the Dortmund-Ems Canal—August 11, 1899.

The Dortmund Harbor was built by the city of Dortmund, and, as it stands, cost about 8,250,000 marks (\$1,963,500). The State assisted the city with a loan of 1,325,000 marks (\$317,000), on which interest must be paid, but which is redeemable by the city at any time; 1,100,000 marks (\$261,800) were paid out for land for the harbor basins, quays, storage, and warehouses and railroads, which cover about 300 acres, and there remains as much more for extension and building.

Ten years have passed since the opening of the original harbor. To the original canal harbor, which lies at the beginning of the canal, an extension has been added, making the basin about 1 kilometer (0.62137 mile) in length. To this has also been added three large basins 60 meters (196 feet) wide and from 360 to 500 meters (1,181 to 1,640 feet) long, and also a petroleum harbor near by, which is separated from the rest of the harbor by a floating barrier contrivance, which prevents the spread of burning petroleum over the whole harbor in case of fire.

The total length of the available wharfage on the harbor basins is nearly 6 kilometers (3.72822 miles), and the entire harbor basins are surrounded with a vertical stone quay, composed mostly of basaltic blocks, which forms a durable and excellent wharf. A new basin is in course of construction which will have a length of 400 meters (1,312 feet). This, in connection with the old town harbor, is intended especially to accommodate shipping companies, forwarding agents, and others interested in the development of harbor traffic.

The entire harbor basins and wharves are connected by the city railroad with the harbor railroad station, which is a regular tariff station of the State railroads. Storage warehouses have been built for the convenience of the canals and railways, supplied with water, drainage, and electricity for power and light. These may be rented at moderate prices. The city also leases ground with hereditary rights of building and re-leasing, which gives practically perpetual rights. Two wide iron bridges lead across the harbor basins from the city, avoiding a wide detour. A swing bridge for passenger traffic is also being built across the new harbor basin. A passenger waiting room has also been provided for the swing bridge.

The city has erected convenient, modern appliances for loading and unloading freight of all kinds. In front of the three large city warehouses are four electric-power portal cranes for removing freight from ships to storehouse or to railway wagons, or vice versa, and there is also a large steam-power crane for handling coal, ore, etc. A hydraulic tilter is also supplied, whereby from 10 to 12 tons of coal per hour can be tilted into the barges.

One of the storehouses is utilized as a customhouse and bonded warehouse, where goods may be stored free of duty until removed.

For the storage of grain, a large elevator has been built. It is six stories high and is provided with an apparatus for handling grain by which 77,161 pounds of any kind of grain may be taken from or loaded into ships and placed on any floor of the elevator. At the same time it frees the grain from all particles of dust or dirt, weighs it, and, if necessary, places it in sacks, trucks, or carts. By the same mechanism it is also possible to move the grain to the different floors of the elevator or where otherwise required. Electric power for lighting, supplying the electric current for motors, cranes, etc., is supplied from the city electric works. The supply cable connecting the works with the harbor is about 2 miles long. From here the current is distributed throughout the harbor, and at the same time reduced from high to low tension. The current is transformed from 1,200 volts to 3,200 volts. Cables or wires for the fire alarm and for electric clocks are laid together with the electric high-tension cable.

The water supply for the harbor comes from the city waterworks and is piped in water mains throughout the entire harbor, which, together with an ample supply of hydrants, offers efficient protection from fire. Connection has also been made with the harbor and city systems of sewerage, affording perfect drainage for the harbor and its buildings.

The adjoining country north and west as well as that part of Westphalia to the south and east forms a very busy industrial neighborhood from which traffic is drawn. This territory extends as far west as Gelsenkirchen and Essen, southerly to Grevenbroich, and westerly to Lippstadt and Warstein. There is no doubt that in future the effect of the cheap traffic way offered in the Dortmund-Ems Canal will make itself felt and this zone will be continually extended into the interior, especially toward the south, the more the harbor at Emden is visited by ocean steamship lines. Formerly this territory has been served by Hamburg and Bremen on the one side, and by Rotterdam and Antwerp, via the Rhine and railroads, on the other. The constantly increasing traffic for the past seven years assures a healthy increase for the future. The chief articles of export from the surrounding country are coal, coke, briquets, iron rails, and sleepers, from the immediate coal and iron industries, and towns farther inland send various products of the small-iron, metal, glass, and other industries. Axes, shovels, forks, anvils, vices, axles, glass, paper, and copper and bronze wire are dispatched over the Dortmund-Ems Canal to Hamburg and other eastern ports for exportation.

The receipts are grain, meal, sugar, iron and other ores, wood, sand, and gravel, and for the inland trade, corn, oils, fats, spirits and other necessities.

More and more the fact is becoming known that this route offers a material saving in forwarding freight as compared with previous railroad rates. It is estimated that 1 mark (\$0.238) per ton is saved on ordinary materials, and on piece goods the saving is very much greater. The freight on 100 kilograms (220 pounds) from Dortmund to Hamburg by rail is 2.48 marks (\$0.60) and by canal it is only 95

pfennigs (23 cents). From Dortmund to Stettin the rate on the same goods is 5.02 marks (\$1.19) and by canal it is 1.30 marks (31 cents). To Danzig and Königsberg the rates by rail are 7.25 and 8.09 marks (\$1.72 and \$1.92), respectively, while the rates by canal remain the same as from Dortmund to Stettin. With such a great difference in the freight rates the small charges for loading and unloading from rail to ship and vice versa of about a cent per 220 pounds plays no part. By the collective forwarding of piece goods from place to place of course the difference in rates would not be as much, but it is safe to say that by use of the waterway one-half of the railway charges may be saved. For certain goods, such as coal, iron, steel, cotton, resin, dyers' woods, petroleum, linseed, maize, oats and various raw materials, the railroads offer low rates, but for goods of this description the canal offers exceptionally low charges, especially if it is a question of regular arrivals and large quantities.

From Dortmund to Emden regular weekly sailings have been established in order to promote quick dispatch. To Emden the time necessary is about three days, which is just as quick as by rail. To Hamburg it takes from five to six days, and to Danzig, Stettin, and Königsberg from four to ten days is required. This service connects at Emden with steamers of the Neptune Steamship Line for the north and east sea harbors. These in turn deliver freight inland to the canal boats, which distribute along the canal ports and to the Dortmund terminal. There are also many seagoing canal craft and lighters, which collect all local freight for the north and eastern ports, and return, bringing large quantities of pyrites and other raw materials destined for the interior. The shipping is principally controlled by the Westphalian Transport Company (Limited), but there are besides a large number of Dutch sailing boats, "Tjalken," which accept freight from Dortmund and all along the canal for all the seaports on the north and east seas. Other new companies are being formed to cover even a more extended field.

The great saving in freight is sure to attract additional traffic to this waterway to such an extent that its future importance is assured. It is not only of immense benefit to the immediate territory, but is beginning to be an outlet for the interior. For these and other reasons it is proposed to connect in the near future the canal with the Rhine and the Weser.

In order to offer better connections to the industries lying to the southwest, the city is building a railway line to Hörde, which will bring the great iron works, Höch and Hölder Verein (society), in direct communication with the harbor, and increasing thereby the railroad facilities.

It is true that this new undertaking will require an outlay of from 4,000,000 to 5,000,000 marks (\$952,000 to \$990,000), but the city of Dortmund fully believes that the millions spent in the interests of traffic will bring its full reward in time.

For further particulars as to the original history of the harbor, its building and completion, reference may be had to an illustrated volume entitled "Harbor of Dortmund," by Regierungs und Baurath Mathies, published in 1899.

For the development of the harbor from the time of opening to the present year; for extensions and improvements; for buildings and bridges, wharves, cranes, etc., giving plans and illustrations; for

the building of the city railway for the harbor and its environs; its railroad stations and connections; for a list of the firms situated on the harbor and in the vicinity; and for all statistics in regard to the costs, development, and increase, covering the amounts and kinds of freight handled from year to year, reference to a smaller book on the Dortmund Harbor, written and published this present year, by George H. Schmidt, is respectfully suggested.

THE DUISBURG-RUHRORT HARBOR.

The combined harbors of Duisburg and Ruhrort form what is probably the largest and most important artificial-basin harbor in the world. It is situated at the junction of the river Ruhr and the Rhine, in the northwestern part of Rheinish Prussia.

The river Ruhr was made navigable for small barges by the building of 16 locks, which were finished in 1780. By means of this route it was made possible to transport the products of the rich coal beds of Westphalia to the Rhine, and thence to upper Rhine cities, and also down the Rhine to the seaports. The income from locking fees and storage of coal at Ruhrort was set aside as a separate fund, and from this fund the entire Ruhrort Harbor has been built, which is a good example of the fact that it is possible to make the transportation improvements of a stream pay for themselves out of their own income. Ships bringing coal from Westphalian mines were obliged to unload or transfer their cargoes at Ruhrort, and it was therefore necessary to build dikes above the flood mark for the storage and handling of the coal, and from this beginning new basins have, from time to time, been added, which may best be studied in the different maps in a book entitled "Die Duisburg—Ruhrorter Häfen," beginning on page 20, which shows the development from 1753 to 1890.

Duisburg is one of Germany's oldest cities, although not of Roman origin. Already, in the twelfth century, it had become a trade center of importance, and semiannual "markets" (messen) were held since the year 1173. Duisburg at this time was directly on the Rhine, and her ships traded as far up the Rhine as Strassburg, and down the river to Rotterdam, and as far as London. In 1270 the river Rhine changed its course and Duisburg found itself separated by a distance of a mile and a quarter from the river. This proved a great setback to the development of transportation, for in the old channel only very small flatboats could be floated, and it was necessary to move the loading place for vessels from the Rhine to the lowest stretch of the Ruhr. Later the custom-house was also built at this place. The Duisburg Harbor was begun by a company called the Rhine Canal Company (Limited). This company built a canal from the Rhine to the city, which again brought back direct communication with the river. This work was begun in 1828, and three years later the first ship arrived from the Rhine and anchored before the head custom-house. In the course of a year or two practically all the former traffic was regained.

Shortly after this canal was finished and in working order another company was formed, called the Ruhr Canal Company (Limited), to connect the Rhine Canal with the river Ruhr. This work was begun in 1840 and finished in 1844. Two locks were necessary, and an agreement was made between the two companies whereby free

passage was granted to vessels of the new company through the Rhine Canal on payment of one-fourth of the earnings to the new company. Through the development of the railroads and the rivalry of Ruhrort Harbor with its more convenient connections, the incomes of these companies suffered so that they finally combined under the name of the Rhein-Ruhr Canal Company. Later important connections were made with railroad lines, but the income was still insufficient to meet obligations and pay expenses. The city, however, loaned money for improving the locks and widening the old Rhine Canal, and at the same time connection was made between the outer harbor and the Bergisch-Märkische Railroad. From this time on business increased so rapidly that not only was it possible to pay all expenses, but the income was sufficient to make many needed improvements. During the following years continual improvements were made. In 1889 the harbor came into possession of the city of Duisburg. In 1892 the inner harbor was extensively widened, and in 1895 to 1898 the new parallel harbor was built, together with a special entrance from the Rhine. The harbor now had a wharfage length of 6.83 miles, a water surface of $104\frac{1}{2}$ acres, and wharfage and building space of 445 acres. The total cost for the harbor to the city was 13,000,000 marks (\$3,094,000). The Ruhrort Harbor, together with its railroad connections, belongs to the State, and both this harbor and the Duisburg Harbor prospered, and nearly all available space for industries was taken. In 1905 it was considered best for the continued success of both harbors that they combine their interests, and as it was impossible for the Ruhrort Harbor to take over the Duisburg Harbor and assume its obligations, it was decided to give the entire management of both harbors into the hands of a special board of managers, whose duty is to administrate both properties. This administration is to collect all rentals, fees for harbors and canal, together with the harbor railroad system and the disposition of the property held by both properties. Ten per cent of the income is to be reserved for improvements and a reserve fund not to exceed 5,000,000 marks (\$1,190,000); then, after all expenses are paid, the net profits are to be divided between the Ruhrort Harbor Company and the city of Duisburg. This arrangement is to continue until the Duisburg Harbor debt is paid, when it will become optional for the Ruhrort Company to buy the Duisburg Harbor at a fair value.

Both Ruhrort and Duisburg are on the same banks of the Rhine, separated by the river Ruhr but connected by the new so-called Kaiserbridge, which is one of the finest works of its kind in Germany.

For the history of these combined harbors, together with the plans, maps, and specifications of all the buildings, bridges, locks, mechanism for loading and handling freight, together with statistics as to costs of construction, increase of traffic, and amounts of classified freight handled, reference is suggested to two books entitled "The Duisburg-Ruhrorter Häfen" and "Guide through the Ruhr Harbors."

NEUSS HARBOR.

Neuss, during the German-Roman period, owing to its convenient situation on one of the Roman roads that connected what is now Belgium and the river Maas with the Rhine, and as one of the principal Rhine crossings, was an important trading point.

In the eleventh century Neuss as one of the principal cities under the Archbishop of Cologne, was granted special privileges for trade, and in 1190 the cities of Cologne and Neuss were freed from paying the Rhine duties at Kaiserwerth, which shows that even at that time Neuss had reached an important point as a trade center.

The river Erft made a navigable connection with the Rhine to the north and the Rhine arm connected to the south. In 1195 this north connection began to fill in with sand and gradually receded, so that by the middle of the fourteenth century it was impossible for large vessels to reach the city. Therefore it was necessary to remove the landing place farther and farther until, in the year 1372, the Archbishop of Cologne removed the principal customhouse to the old town of Zons. The old channel had by this time become only a small arm, which for transportation purposes was of no value.

Notwithstanding this great setback, the clever tradesmen of the city continued to improve their trade for another century. Later came the storms of war, epidemics, and fire, and in the last half of the fifteenth century the city withstood a siege of 11 months in the Burgundian War under Charles the Bold. Afterwards came the terrible Thirty Years' war, which decimated every place in the land, and in 1576, on the 1st of May, a greater part of the city was destroyed by fire. Eleven years later came a pestilence which nearly wiped out the entire population.

From 1627 the regular ship traffic between Cologne and Neuss and other harbors was so badly affected by war, etc., that the freight rates were necessarily raised, until they were a great detriment to trade.

A new awakening came after the French Revolution, and the abolishing of many of the old so-called Rheinzölle (Rhine duties) had a beneficial effect, but new fees were added, and it was not for many years after that these burdensome tributes were annulled. The abolition of these taxes was made by Napoleon. He also proposed a canal that should connect the river Meuse with the Rhine, and should pass through Neuss, thus giving the city a direct communication with Viersen, Venlo, the river Maas to the river Scheldt, and Antwerp. Work was begun on this canal in 1808, but after working for two years and spending about \$800,000, on account of Holland having been taken into the French Empire, it was no longer considered necessary, and was abolished in 1810.

After the fall of Napoleon and the return of Rhineland under Prussian rule in 1815, another effort was made to make a navigable connection with the Rhine. After much discussion it was finally decided to utilize the old stream—the Erft—for the project, and in 1818 permission for building was granted. The lack of capital and the difficulty of raising the same delayed the building until 1837, when, after two years, the Erft River bed was widened and made deep enough to accommodate large vessels to the city. The hopes of regaining its former importance as a trade center were soon realized, and shipping increased rapidly. In 1886 connection was made with the state railroads, the better to accommodate and connect the interior with the canal. With the development of shipbuilding and the introduction of steam power and the consequent increase in the size of vessels, it was imperative that the canal should be enlarged and

made deeper to accommodate the increased draft of vessels. This work was done as soon as possible and the canal was given a width at the bottom of from 65 to 82 feet. A turning basin was dug in one part of the canal by widening it to about 400 feet, so that together with the mean low depth of 8 feet 4 inches it was not only possible to accommodate the largest Rhine steamers, but also the Rhine ocean-going steamers. The immense amount of earth so removed was utilized to fill in the right bank of the canal and for filling the wharf space along the canal, at the same time giving protection against inundation in time of floods. At the mouth of the canal, where it enters the Rhine, the canal has a width of 131 feet.

Ten years later, in 1893, it was decided to increase the harbor by building a great harbor basin which could be extended to the southern part of the city, thereby greatly adding to the wharf and building space. At the same time the city decided to open up a large tract of land for the building of factories, warehouses, etc., that should be attracted by the excellent facilities for loading and unloading goods and the low rates of water transportation. At the same time plans were made for the building of a narrow-gauge railroad that should connect all new wharf and building space with the state railroads. In 1908 this great work was finished, and on June 17 of that year it was formally opened for use. The new basin is 2,400 feet in length and has a width at the bottom of 164 feet and the same depth as the canal. The sloping walls to the Erft Canal and the old harbor are 7.7 meters (25 feet) high. This is not quite high enough to resist high water, but it makes an excellent unloading place for small vessels and avoids high lifting of the freight. The new harbor and its wharves and building space are well over the high-water mark and quite safe from being flooded. The banks are protected by a stone wall 36 feet high. On the city side of the canal the stone wall has a foundation of cement to withstand the extra traffic, as this side is reserved as a permanent wharf for unloading and loading. As the business increases new parallel basins will be built, one of which is already in process of construction.

At the same time that the new harbor basin was being dug the city erected on the city side of the harbor a new storage warehouse. The old harbor was enlarged 82 feet in width as far as the turning basin, thereby giving space for the warehouse and for other freight forwarding companies. On the opposite side much new space for building was made available, and at the same time connected with the harbor railroad. Many new industries have bought land on this new ground, and among them are the International Harvester Company and the American Radiator Company, both branch factories of the great Chicago firms of the same name. The former has taken about 25 acres and the latter 14 acres. The sale of land for these two companies so encouraged the administration that they immediately commenced a new parallel basin which should form adequate wharfage and loading and unloading facilities for these new ventures.

The harvester company is situated on a promontory which has canal accommodations on three sides. In the case of the radiator company, the new canal was necessary in order to give it direct canal communication. Both firms are in process of erecting the necessary buildings for their respective plants. The harvester company com-

menced building in April, 1909, and it expects to have the works in operation in February, 1910. It may be of special interest to know that agents of the International Harvester Company made a tour of the entire waterways of Germany, finally deciding that the Neuss Harbor offered superior advantages to all others. Many of the harbors only rent space for building purposes, while at Neuss ground can be either purchased outright or rented on lease for usually fifteen years. Leases are made upon a 4 per cent basis of the value of the land, with an option of releasing at the end of the term at a revaluation. Not only is the Neuss Harbor convenient to the railroad centers of Europe, but it is on the most important waterway in the Empire and in direct connection with the great seaports of Germany, Belgium, Holland, England, Sweden, Norway, Denmark and Russia. They are building their own cranes for handling their raw materials and products, and all machinery, etc., is brought in the original packing right to their door. They will also have the advantage of the lowest rate of freight to all points for their manufactured products. It is expected that they will soon have to employ a force of 600 workmen. It is proposed to introduce American machinery and to reproduce the harvester machines exactly as they are manufactured in the home factory. Through the expiration of the original patent rights and the duplicating of their machines by foreign manufacturers it was no longer possible to pay foreign custom duties and be able to compete with the foreign makers, but it is hoped that by manufacturing with superior American machinery and methods they will be able to successfully compete with the foreign manufacturer upon his own grounds, thereby continuing to hold the foreign trade they have so long enjoyed.

The city storage warehouse, erected in 1906, is located very conveniently to the city and is built entirely of iron-concrete. It is 656 feet long by 45 feet wide and four stories high. It cost about 400,000 marks (\$95,000). The rental is made upon a 6 per cent basis of the cost of building. This building is rented to spediteurs and forwarders who are especially interested in building up the trade and traffic of the harbor. Special facilities have been furnished for the convenient handling of freight. Twenty railroad tracks, three half-portal cranes, elevators, and one large bridge crane are at hand to quickly remove the cargoes from ship or car to the storehouse, or vice versa.

In 1908 a large basin was built to accommodate the large rafts of logs arriving from the Schwarzwald (Black Forest). This basin has a wharfage length of 12,795 feet and a water surface of 158,000 square meters.

Since 1903 the following improvements have been finished or started:

The new harbor basin; begun in 1905, finished 1908.

Widening the old harbor and connecting it with the new harbor; begun 1907, finished 1908.

Building the Ring and Harbor Railroad, with a total length of rails of 21 miles; begun in 1904, finished in 1908.

The beginning of a new parallel basin; begun June 25, 1909. In November 247,000 cubic meters had already been moved.

A large flour mill at Neuss cost about 2,500,000 marks (\$595,000), and has a capacity of 2,500 sacks of wheat or rye per day. This is the

largest industry situated on the old harbor. Two ship elevators having a capacity of moving 220,000 pounds of grain per hour have been installed. Neuss has an important trade in flour and grain. Neuss is also an important market for lumber; large sawmills and lumber-yards covering 50,000 square meters of space are situated on the harbor. Large imports of American sawed lumber are regularly received by this cheap water transportation.

Since 1905 thirty large industrial firms have bought space and built their factories or plants on the new Neuss Harbor, which offers an excellent example of the rapid increase of business and also of population.

Every facility for the quick and convenient handling of freight has been provided by the city. They have two steam towing boats of 180 tons each, which are provided with pumps for fire purposes. The city railroad possesses 100 wagons and 5 locomotives. Prices for towing and unloading vessels are made as low as possible, as may be seen in the accompanying lists of charges. This undertaking which has been so successfully planned and carried out offers an excellent illustration of the possibility of a city in reduced circumstances, and with only a population of 4,000, assuming obligations of 8,000,000 marks and developing the undertaking to a point where its ultimate success is assured. At present there is a deficit of about 30,000 marks (\$7,140) per year which is made up by the city. A plot of 25 acres of ground on the new canal was recently sold for 400,000 marks (\$95,000), or \$3,800 per acre. Without the new harbor improvements this land would not have been worth one-tenth of this amount. The city has also increased in population to 35,000 and is growing at present at the rate of 1,000 per year. What the city gains in taxable property and trade with this great increase more than makes up for the debts incurred. If the city had not looked into the future and made provision for it by the public utilities it has installed, it would still be a small village of no importance, as it was years ago after the Thirty Years' war.

There are employed in the harbor, on the railroad, the towboats, and for policing the harbor, and for running the cranes, and as laborers, from 160 to 200 men. They are paid from 3.50 to 4 marks (\$0.83 to \$0.95) per day, inclusive of all Sundays and holidays.

For more minute details as to statistics of the growth of the traffic, amount of freight handled from year to year, etc., see two books entitled "Rhein-Erft-Hafen" and "Festschrift" of Neuss, 1908.

The amount of customs collected in the harbor of Neuss increased from 4,907,340 marks (\$1,127,994), in 1906, to 7,514,144 marks (\$1,788,366), in 1908.

THE DÜSSELDORF HARBOR.

The development of Düsseldorf as a river port of importance dates from the year 1288, when Graf Adolf V. Von Berg granted special privileges to the city, allowing it to collect revenue from all passing vessels on their way to the mountains. Many of the ruling barons having portions of their domains on the Rhine, including the great Bishopric of Cologne, fattened on the tribute collected from the river traffic, and this condition lasted for many years.

The growth of the city and of its trade was necessarily slow and seriously retarded owing to the so-called "Staple right," which had long been enjoyed by its powerful neighboring city Cologne. This right compelled all passing vessels to unload and put their cargoes on sale for at least three days, after which time they were at liberty to reload the unsold portion of their goods and transport them farther up or down the river, as they wished.

High duties were collected (Rheinzölle) not only here, but in many other places on the Rhine, and under such burdens it was impossible that a healthy growth in the business of navigation should exist.

Napoleon abolished the Rhine duties, but new tolls were levied, such as octroi, recognitions, and bridge-passing taxes, and the old unloading right at Cologne continued for many years.

Nothing had been done in the way of improving navigation upon the river, and it was not until about 1831 that bordering States passed an act binding themselves to improve the channels and to secure the banks where necessary from washing away and to prevent inundation. At this time the levying of tolls and taxes at the different landing places had become so burdensome that the Cologne-Düsseldorf Steamship Company were obliged to pay an annual sum of 20,000 thalers (\$14,280), equal to 2 per cent of their entire invested capital. Fortunately, in the year 1868 an act was passed abolishing all of these burdens of tribute, including the unloading law at Cologne, making the river free.

WHARVES AND HARBORS.

At all important places of trade upon the river new improvements were now made to meet the ever-increasing flow of traffic. Düsseldorf, however, lost many valuable years in a warmly contested discussion as to what the new improvements should consist of and as to where they were to be built. Finally plans were perfected for a new harbor to be built on the south side of the city on a peninsula caused by an acute bend in the river convenient to the city and its river frontage, and work was commenced early in 1891 and the harbor was finished and opened for use with appropriate ceremonies on May 30, 1896.

In order to utilize the river front, which extends along the entire old part of the city from the harbor entrance to the new Rhine Bridge and to afford adequate protection from inundation in times of high water, work was immediately started to build a solid stone quay and dock along this important way. Plans were made to raise and fill in the river front at the same time, so that the quay would be high enough to afford security against any possible river floods. These plans were also made to conform with those for the new Rhine Bridge, that was built in 1896-1898. The approaches to the bridge were filled in, forming a level the same height as the quay to which they were finally connected, and this wall, together with the "Napoleon safety harbor," forms a complete dike for the city. This dock is built mostly of cut stone and basaltic blocks, and is provided with ample facilities for docking and landing passengers and freight. The city has also boulevarded and beautified the broad

street back of the wharf, thereby adding much to the beauty of the city. This great work was not finished until 1902, since which time it has been in constant use. Being in direct communication with the harbor, it makes a most modern industrial landing. This, together with the most excellent facilities for moving freight, proves a constant attraction for various industries to take advantage of excellent conveniences offered. The available ground for building and other purposes contained in the harbor covers about 335 acres, of which about 40 acres are immediately adjacent to the harbor basins. It also has over 6 miles of wharf, which makes it one of the largest artificial harbors extant.

The uses of the harbor are varied, giving excellent opportunities for the forwarding of through freight from river and sea inland by rail to the most thickly populated and greatest manufacturing center of Germany, or vice versa, from land to water. There are 150 acres of wharf space, conveniently connected by the harbor railroad, with the best modern equipment for storage.

Over 6 miles of broad well-paved roads connect the harbor basins and wharves with the city and the surrounding country. Forty electric cranes, with lifting power from 3,500 to 56,000 pounds, are erected at convenient places on the wharves for public use at a reasonable price. There are also special traveling cranes for loading and unloading sand and coal. Ships are not compelled to pay harbor charges, excepting those which enter the harbor to escape the danger of ice, without loading or unloading, when a fee is charged on the tonnage. A fixed rate of charges, according to value, is levied on all incoming freight by water, while outgoing freight is free.

The city has provided special protection for the harbor against fire and thievery. A special fire company, with an auto chemical engine, fire hose, and hook and ladder, are on watch both night and day for immediate attack, and are also connected with the city fire department. Notwithstanding the fact that the entire harbor is piped with the city water mains, a special high-pressure system has been installed for pumping water from the harbor basins, so that it is possible to reach the highest buildings with water to quench the fire. Fire steamers are also constantly on duty.

A police station, with sufficient force to patrol the entire harbor both day and night has been established. The harbor is well lighted by several hundred street lamps and electric arc lamps. Electricity is also furnished for cranes, elevators, motors, etc., part of the current coming from the temporary harbor plant and part from the city electric works. The current is furnished to the harbor tenants at regular city rates.

The customs harbor has been provided, entirely at the expense of the city, with necessary buildings. A fine customs building, six stories high, built of stone and iron and concrete, is used for the combined purpose of customs collecting and for a bonded warehouse. It is lighted with electricity throughout and has elevators from cellar to roof, and cranes for loading and unloading. It is divided into three compartments with fire doors, and is both fire and rat proof. A public warehouse has also been provided; it is 540 feet long, is also built entirely of iron and concrete and is fireproof. Space in this building is rented to those desiring it at a reasonable rate.

Düsseldorf has now become an important trade center and its harbor and wharves are among the largest on the Rhine. Space bordering the harbor basins and docks was rapidly leased for all kinds of industries, until all was taken. Because of constant applications for more harbor space and the fact that the traffic had increased three-fold since the beginning, it was decided to extend some of the old basins and build new ones, which would add new leasing space of at least 50 acres. This new work was partly finished in 1887 and partly this year, 1909.

The old petroleum harbor was abolished and placed at a more safe distance from the city; a new plant was built, with excellent facilities for storing and pumping the oil, also a factory for the distillation of benzine. The old petroleum harbor was utilized as a new harbor basin.

Already much of this new space has been leased to various industries desirous of taking advantage of the cheap rates for receiving their raw materials by water transportation. The length and cost of the leases are made according to the value of the building, or plant, that is erected. They are subject to revaluation from time to time, according to the increase in value.

The entire harbor is constructed without bridges or locks, and is in direct connection with the Rhine by an entrance 250 feet wide. All of the basins have a depth of $6\frac{1}{2}$ feet below the mean low-water mark of the Rhine, so that vessels can ride in safety with no danger of grounding at low water. This depth not only accommodates the largest river steamers having direct connection up the river as far as Strassburg but the large ocean-going steamers making direct transit with London, Rotterdam, Antwerp, and the Baltic ports as far as St. Petersburg.

Cheap freight rates to all parts of the world are offered by local forwarders over all domestic and foreign lines, and this port is already recognized as an important harbor for seagoing vessels.

A harbor freight station has been provided in connection with the harbor railroad system, which forms a gate to the harbor railroad. Fees for unloading, handling, and transport of freight end here, as far as harbor charges are concerned, and the state railroad tariff begins.

A harbor has been constructed at Heerdt, on the left bank of the Rhine, that takes care of the traffic on that side. It has ample railroad connections and will be increased in size as fast as the increase of traffic demands. This increase is growing rapidly, as is shown by the following: 24,211 tons of freight were handled in 1900, the first year, and for the year 1908, 257,587 tons were turned over.

All of the work in harbor building and improvement has been done entirely by the city of Düsseldorf at an original cost of 18,000,000 marks (\$4,284,000). Owing to the great expenditure on the new harbor extension the income is sufficient to pay a fair interest and sinking fund on the investment, but the rapid growth of traffic, which has increased from 376,877 tons in 1895 to 1,083,333 in 1908, is most reassuring.

Düsseldorf is the ninth city in Germany, and has a population of 350,000. It is known as the "Garden City," and is situated in the

center of the greatest manufacturing district in Prussia. Within a radius of 20 miles there is a population of 5,000,000 people.

Three hundred and twenty trains arrive and depart from the central station carrying passengers only, a service excelled by few German cities. In 1907 there were 14,850 factories, employing 98,902 workmen. The increase in general business is well illustrated by the receipts and expenditures of money at the branch of the Imperial Bank located in the city. In 1899, 1,993,313,100 marks (\$464,458,514) were handled, and this increased to 4,327,488,300 marks (\$1,029,792,215) in 1907. The collection of customs and indirect taxes in the Düsseldorf harbor increased from 12,638,620 marks (\$3,007,991) to 23,967,328 marks (\$9,107,444) in 1908.

RIVERS AND CANALS IN THE CONSULAR DISTRICT OF COLOGNE.

Report by H. L. DUNLAP, *Consul.*

This report refers only to the rivers Rhine and Moselle, which are the only navigable streams within the borders of this district. There is no canal within the district, so that no reference is made or intended in regard to that portion of the subject.

I. PUBLIC SUPERVISION.

(a) The duty of supervising improvements, initiating new ones, and caring generally for the river is in the hands of the Rheinstrombau Verwaltung (commission for the improvement of the Rhine), with headquarters at Coblenz. This commission has general supervision from the border of Holland to that of Switzerland, and once each year, accompanied by representatives of the transportation companies, members of the several boards of trade of the cities on its banks, and members of the agricultural societies of districts through which the rivers flow, journey from one end of the district to the other, holding consultations with the authorities where improvements or changes are asked for and making a thorough inspection of all proposed improvements. Afterwards the commission meets, considers all propositions before it, makes its recommendations, asks for appropriations, and sends its report to the national government at Berlin, which approves or disapproves as it sees fit.

(b) (1) This commission possesses no power whatever over navigation corporations. (2) It has no power to regulate freight rates. (3) It publishes an annual report of its doings. (4) It maintains the channels of the streams so far as the money appropriated by the general government permits. It has no control over docks and terminal facilities, which are the property of the municipalities.

(2) The statistics of water-borne traffic are collected by the authorities of all cities and villages and are published in book form by the Zentralkommission für die Rheinschiffahrt (central commission of Rhine traffic) in Mannheim, which includes them in its annual report along with other statistical information.

II. WATERWAY IMPROVEMENT.

(a) No water power is developed by the improvement of rivers for navigation purposes.

(b) The general government has undertaken the improvement of navigable rivers entirely; there is nothing done by local governments or private enterprise.

The Prussian Government has, according to a statement made by the president of the Rhine Province at Coblenz in answer to inquiries, spent about 50,000,000 marks (\$11,904,738) in the improvement of the river. This improvement consists in building walls to prevent erosion of the banks, contracting the width of the river to increase its depth by projecting walls of stone running into the river to hinder the flow and confine the water to the channel, and by blasting rock to deepen the channel in shallow places and dredge it where there is a clay or sand bottom. This dredging is kept up continually, and considerable revenue is derived from the sand taken out at points where it collects and fills the channel.

III. FLOATING EQUIPMENT.

(a) There are in use on the Rhine and its tributaries 11,077 boats of all kinds, according to the latest report obtainable, of which 1,318 are steam passenger, freight, or tow boats, and 9,759 freight barges of varying sizes. The steamboats possess 295,848 indicated horsepower, and the barges have a capacity of 3,960,378 tons.

There are a few ocean steamers of 1,500 tons which go up the river as far as Cologne, up to which city the average depth of water is 9 feet; at low water considerably less. A line of freight boats makes daily trips to Rotterdam, in Holland, having a draft of 1.20 meters (46 inches). The passenger steamers running from Cologne to Mainz draw even less, but they are used only for passenger traffic, mostly during the tourist season.

All the freight traffic above Cologne is carried in barges, towed by either side-wheel or propellers built especially for that purpose. Of these Rhine steamers, 172 are side-wheel, with 112,338 horsepower, and 1,146 propellers, with 183,511 horsepower. Of this number 99 are passenger, 68 passenger and freight, 192 freight, 18 freight and tow, 896 tow, and 45 in different uses. Of the 9,759 barges, 6,637 are iron or steel with 3,443,297 tonnage, and 3,122 wooden boats, with 517,081 tonnage. The Rhine fleet, owned in Germany, is valued at 250,000,000 marks (\$59,523,809) and is composed of 682 steamers with 188,690 horsepower and 2,800 barges, with 1,881,261 tonnage.

SIZE AND DRAFT.

The largest passenger steamers running above Cologne are 83 meters long, 8.2 meters broad, and 1.30 meters draft, with 1,250 indicated horsepower (length, 272 feet; width, 27 feet; draft, 51 inches). The largest freight steamers from Rotterdam are 83 meters long (1 meter=39.37 inches), 10.08 meters broad, and 2.77 meters draft, with a load of 1,306 tons, the engines indicate 600 to 650 horsepower.

Of the tow steamers which comprise more than two-thirds of the fleet the largest have from 1,500 horsepower down. The largest screw towboats are 43 meters long (meter=39.37 inches), 10.06 meters wide, and 4.38 meters draft, with a load of 1,770 tons, indicated horsepower, 600.

The largest barges are 123 meters long (meter=39.37 inches), 14.08 meters wide, 2.85 meters draft, and a tonnage of 3,581 tons.

COST OF BOATS.

The price of modern side-wheel towboats complete is from 250 to 350 marks (mark=23.8 cents) for each indicated horsepower; of screw towboats, 200 to 260 marks (mark=23.8 cents) for each indicated horsepower; barges from 50 to 55 marks for each ton.

(6) There are no special types of boats used for different purposes or on different reaches of the river, that being governed entirely by the depth of water.

(7) Each towboat, according to size, tows from four to six barges, that depending upon the size of barge and the tonnage. Longer tows are not possible, owing to the crooked channel in places, for if too long the last barges would be liable to ground.

(8) All barges are used wherever the depth of water permits.

IV. OWNERSHIP OF VESSELS AND BUSINESS ORGANIZATIONS.

(a) No vessels are owned or operated by canal companies.

(b) There have been no instances of combination in the Cologne district. Attempts to combine have been made, but not successfully.

(c) Vessels are not owned at all by railway companies. Many of the boats, both tow and barges, are owned by the coal-mining companies, whose output they transport.

(d) The public authorities own and operate no vessels.

(e) So far no combination of towing has been successful in securing the cooperation of sufficient firms owning towboats to make a monopoly or trust. Sufficient independent lines have remained out to render all such attempts unsuccessful.

V. TERMINAL FACILITIES.

(a) All the docks and wharves along the river, except those of refuge from ice, are owned by the municipalities. Wharf boats are usually owned by the transportation companies and are inexpensive affairs. At the cities of Mülheim, Cologne, Coblenz, and St. Goar, in the Cologne district, there are artificial harbors dredged to a sufficient depth, walled on both sides, amply provided with customs warehouses and administration offices, steam cranes and elevators, scales, railway tracks, etc. Ground is rented to private parties for the erection of private warehouses, where goods not dutiable are loaded and stored.

The two harbors at Cologne cost, respectively, 23,000,000 marks (\$5,476,904) and 7,000,000 marks (\$1,666,666).

(b) All loading and unloading of merchandise and other goods capable of being so handled is done by steam cranes, owned by the municipality.

(c) All harbors and loading places are connected with the State railways, which are so arranged that goods may be loaded from boats into cars, or vice versa. As the railways are all State owned, they necessarily all connect either with belt lines or connecting tracks.

(d) All river terminals and wharves are owned by municipalities, except in rare cases where landing stages have been built by the steamer companies.

VI. TOLLS AND FREIGHT RATES.

(a) Tolls are not charged on rivers as yet, but the proposition to charge them has been seriously considered and will in time, no doubt, be inaugurated.

(b) The elements of depth of water and scarcity of loads enter into the rates of freight, which vary weekly, oftentimes daily. There are no towing companies in this consular district.

(c) Tariffs are irregular, but classification is regular. Competition, however, and amount of freight offered have much to do with rates.

(d) I am not able to reply to any of the questions under this heading.

(e) There are no joint rail and water tariffs in this district. The rail tariffs on the river depend on circumstances, and should there be an agreed rate by river and rail the river transporter must be the one to gain or lose.

(f) There is no competition whatever between the railways and waterways.

(g) The railways being state-owned, have a tariff that can not be varied. There is no competition between lines, no soliciting or rebate agents. There is no agreement of any kind with the river transport companies.

(h) It would be an unheard-of thing to ask for a reduction of railway rates for any reason. They are as fixed as the laws of the Medes and Persians.

As a general thing goods for foreign shipment are insured by the owner or forwarder. Internal traffic is not generally insured. Freight rates are not affected by insurance.

VII. WATER-BORNE TRAFFIC.

(a) Traffic on the Rhine from Cologne to Rotterdam consists of all kinds of merchandise, such as package freight consisting of manufactured goods, tallow and oil in barrels, fertilizer in sacks, cotton in bales, hemp and sisal in bales, copper and lead in ingots, machinery, which articles are generally transported by freight steamer. By barges from seaports, the cargo generally consists of grain, oil, cotton, etc. The local transportation up the river is largely coal, which is mined in the Barmen consular district. Down-river traffic consists largely of paving stones, cement, mine supports, telegraph poles, lumber, wood, etc. The principal freight on the Rhine between Ruhrort and the upper reaches is, of course, coal.

(b) I am unable to obtain statistics of water-borne traffic. The Centralkommission für die Rheinschiffahrt at Mannheim, Baden, publishes a yearly report which contains about all the statistics for shipments on the Rhine.

(c) Taking the Rhine and Moselle Rivers for examples, local traffic, i. e., that originating along these streams is much greater than traffic originating elsewhere owing to the coal mined and lumber cut in their vicinity.

(d) As all the river transportation companies have their headquarters in other districts, no doubt other consuls will cover the pay for workmen, such as boatmen, firemen, engineers, etc. The pay of men employed in the Cologne Harbor varies from 3.50 marks per day for common laborers to 8 marks (mark=\$0.238) for engineers and foremen.

The amount of wages paid to employees of steamships, custom-house employees, and dock laborers, as given by the superintendent of the harbor, is shown by the following table:

Employment.	Weekly wage.		Monthly wage.
	Marks.	Marks.	
Engineers on boats, first class.....	35.00	.....
Engineers on boats, second class.....	30.00	.....
Engineers on towboats, first class.....	45.00	.....
Engineers on towboats, second class.....	34.00-35.00	.....
Engineers on dock cranes.....	.....	300	
Firemen on steamships.....	25.00	.....
Firemen on towboats.....	28.00-30.00	.....
Firemen on cranes.....	31.50	.....
Clerks in customs department.....	.....	200-340	
Inspectors of customs.....	.....	285-465	
Watchmen at customhouse.....	.....	180-220	
Deck hands on steam and tow boats.....	21.00-28.00	.....

CLOSING REMARKS.

The regulation of the water in the Rhine is considered as finished by the commission. Additional improvements are being considered, one being to make the upper river navigable from Strassburg to Basle, in Switzerland, 127 kilometers (about 80 miles), which is not at present navigable except at high stages of water and as a result of deepening the channel at several points.

Traffic on the Rhine is continually on the increase. No statistics are at hand to show the total tonnage, but that passing between Germany and Holland at Emmerich, which can not be more than half, was for the years 1890, 5,883,000 tons; 1900, 13,192,000 tons; 1908, 21,834,000 tons.

Freight rates fluctuate according to the amount offered and the stage of water. In 1907 rates between Rotterdam and Mannheim (570 kilometers) were from 2.25 marks to 10 marks per ton (mark=23.8 cents); between Ruhrort and Mannheim (350 kilometers) in April, 1907, 1.61 marks, and in November 5.81 marks per ton.

The average navigable width of the river varies below Cologne 150 meters (39.38 inches), with an average depth of about 10 feet; above Cologne from 2 to 2½ meters.

Formerly a part of the river was supplied with a large chain, which, passing over a drum on the tug, provided means for hauling loads over rapids, and I believe this system is still employed between Mainz and Frankfort.

There are no great fluctuations in the depth of water in the Rhine, although it flows through a semimountainous country. The snow-fall is not excessive and the hills are all covered with evergreen, whose shade retards the rapid melting of snow and also retards the

rapid running off of the rainfall. After the most severe rains or sudden thaws the rise is not much over 15 feet, seldom so much, and reasoning from this one might infer that were the hills in Pennsylvania near the source and along the flow of the Alleghany and Monongahela Rivers covered with spruce or pine the rapid rise and destructive currents of these rivers and of the Ohio might in a considerable measure be prevented.

As before mentioned, the Rhine is provided with artificial harbors owned by the municipalities; in addition the State has provided harbors of refuge where boats may seek cover from floating ice. No injury to shipping is done by the breaking up of ice in the spring, as is the case in American rivers, notably on the Ohio.

INLAND WATERWAYS AND CANALS IN THE CONSULAR DISTRICT OF BRESLAU.

Report by HERMAN L. SPAHR, *Consul.*

The principal waterway in this district is the Oder River, with its tributaries and canals. The Oder rises in the Austrian Province of Mähren, enters Germany near Oderberg, flows through the Prussian Provinces of Silesia, Brandenburg, and Pomerania, and empties into the Baltic Sea. It is 900 kilometers (559.23 miles) long, and its source is about 634 meters (2,080.04 feet) above sea level. The stream is divided as follows, according to the varying character of the valley:

Name.	Length.	Fall.
The source Oder to the Olsa River, near the Austrian border.	133 kilometers (82.64 miles).....	1:300
The upper Oder to the Weide River, below Breslau.	225 kilometers (139.81 miles).....	1:2,750
The middle Oder to the Warthe River, below Kustrin.	351 kilometers (218.1 miles).....	1:3,620
The lower Oder to Stettin.....	147.4 kilometers (91.6 miles).....	1:13,440

The longest tributaries are the Warthe, the Bober, the Lausitzer Neisse, the Glatzer Neisse, and the Bartsch.

The Oder proper is navigable from Ratibor, in Silesia, to the sea, 752.5 kilometers (467.58 miles). The total length of navigable waterways in the Oder system is 2,184 kilometers (1,357.07 miles), of which the most important tributary, the Warthe, furnishes 347 kilometers (215.62 miles), and its arm, the Netze, with canalization, over 300 kilometers (186.41 miles).

Important canals are the Klodnitz, the Bromberg, the Finow, the Friedrich Wilhelm, and the Oder-Spree, while the channel for large ships (Grossschiffahrtsweg) at Breslau is also of prime importance.

The Klodnitz Canal was dug in 1790 from Gleiwick to the Oder below Kosel. Length, 45.66 kilometers (28.37 miles); fall, 49.18 meters (161.35 feet), overcome by 18 locks. It enables the great coal and iron industry of Upper Silesia to use the waterways. The lock dimensions are, however, too small to meet modern demands, offering an uninterrupted progress only to smaller boats. Since the opening of the Upper Silesian Railway—1856—the products of that district start mostly by rail.

The Bromberg Canal was begun in 1772; it cost originally 2,052,400 marks (\$488,471), but has been much improved since that time. It connects the Netze River—hence also the Warthe and the Oder—with the Weichsel, and has 10 locks.

The Finow Canal was dug in the seventeenth century and joins the Oder (at Hohensaaten) with the Havel and thus with the Elbe.

The ancient Friedrich Wilhelm Canal joins the Oder at Brieskow with the Spree and thus with the Elbe.

The Oder-Spree Canal.—Since the two last-mentioned canals were not built for large boats, it was determined to construct another canal to permit ships of 400 and 500 tons burden, measuring 55 by 8 meters (180.45 by 26.24 feet), to ply both the Elbe and the Oder. The canal begins at the Seddin See and enters the Oder near Fuerstenberg, 23 kilometers (14.29 miles) above the Friedrich Wilhelm Canal, using in its course part of the latter and also part of the Spree River. The busy industrial section of upper Silesia is thus enabled to forward its products direct by water to Berlin and Hamburg in large ships from Kosel. The Oder-Spree Canal was finished in 1890; it is 87.9 kilometers (54.62 miles) long, of which 55.6 kilometers (34.55 miles) had to be dug.

The Grossschiffahrtsweg at Breslau was completed in 1897. Up to that time the city was the upper terminus of the heavy shipping, as no boat over 175 tons could pass the locks there. The canal passes around Breslau to the north, using in part an arm of the Oder. It has 18 meters (59.05 feet) bottom width and a minimum water depth of 1.50 meters (4.92 feet). The five locks are each 55 meters (180.45 feet) long, and 9.5 meters (31.16 feet) wide, sufficient for 400-ton ships. With the construction of this canal—preceded by the enlarging of the locks at Ohlau and Brieg, the canalization of the Oder from Kosel to the Neisse mouth, and the building of a transfer haven at Kosel (all completed in 1895)—the rapidly developing navigation on the lower Oder was brought into close touch with the great mines and works of Upper Silesia.

I. PUBLIC SUPERVISION.

(a) The rivers and canals of Prussia are under the jurisdiction of the Prussian Government, and the departments of public works, commerce and trade, and agriculture have supervision over measures of improvement, regulation, navigation, and protection. The authority is delegated by law to various royal waterways-improvement commissions, among which in this section may be mentioned the Oderstrombauverwaltung, for the Oder from the Austrian border to Schwedt, near the Pomeranian boundary, and the Strombauverwaltung der Märkischen Wasserstrassen, for Pomerania and the waterways between the Oder and Berlin (except the Stettin and Berlin district).

The Oderstrombauverwaltung was established in 1874 for the stretch from Breslau to Schwedt, but in 1879 its authority was extended to the Austrian line. It has its seat at Breslau, and consists of the governor (Oberpraeisident) of Silesia as chief, and his substitute; the director of Oder improvements (Oderstrombaudirektor and his substitute; a judiciary; a secretary; also 9 inspectors, 9 district inspectors, 5 supervisors, and 12 assistants, all with titles of Regierungs-und Baurat, Baurat, Bauinspektor, Regierungsbaumeister, or Wasserbauinspektor.

The stretch delegated to this commission is divided into nine water inspection districts, each under a district inspector with a stream master, stream overseer, lock master, haven master, dredging master, etc. Municipalities or corporations constructing havens, loading places, etc., at their own expense have control of these with government supervision.

In 1881 the Oder navigation commission (Oderstrom-Schiffahrts-Kommission) was established on the same plan as the navigation commissions for the Rhine and the Elbe. It makes a biennial inspection trip over the navigable course delegated to the royal Oder improvement commission (from Ratibor to Schwedt), and suggests, approves, or opposes projects. The standing members are the Ober-praesident of Silesia as chairman, the Oderstrombaudirektor, inspectors of navigation, and other technical and non-technical officials charged with navigation, commerce and dike matters. Occasional members are unlimited, being suggested each year by the interested chambers of commerce, shipping and mining companies, agricultural and dike associations, and are selected by the chairman with regard to the matters to be considered.

(b 1) With capitalization of navigation corporations the Oderstrombauverwaltung has no concern. The Government frequently authorizes by statute a loan to dike associations.

Freight rates are fixed by the ship owners, companies, and associations. The commission has no power to regulate them. Reports of operation are made by the district inspection bureaus.

The maintenance and the improvement of the channels and the building and maintenance of all government constructions constitute the main duties of the commission over the stretch prescribed. For instance, in 1906 the following were the principal matters handled:

Works begun: Extension of improvement works between Ratibor and Kosel; improvement of the Oder at Oswitz below Breslau; building of two locks in the canalized Oder for towed fleets. Works continued: Putting up two electric coal dumpers in the Kosel haven; building a third dock for the Kosel haven; building a lock sufficient for towed fleets near the mouth of the Neisse.

Works completed: A winter haven at Frankfurt; channel improvement from Ratibor to Kosel.

(b 2) Statistics of water-borne traffic are collected at the various locks, havens, etc., by the responsible authorities and published officially by the improvement commission every two years in its *Mitteilungen* (pamphlet of information). The latest issue appeared in 1907; the 1909 issue has not yet been distributed. The local statistics are furnished annually for the reports of the various chambers of commerce. Complete statistics for the inland waterway traffic, with much other material, are compiled by the Imperial Statistical Office with the assistance of the commissions, and published whenever the upper house of the empire requires it. The volume concerning the Oder and other Baltic rivers was issued in 1876, 1891, and 1908.

II. WATERWAY IMPROVEMENTS.

(a) See the comprehensive report on Prussia's policy in regard to water power, by Consul General Thackara, in *Monthly Consular and Trade Reports*, January, 1909, pages 132 to 135.

(b) River improvements and construction of canals in this territory have in general been carried on at the cost of the Prussian Government whenever the main object is to better navigation and promote commerce and trade. Municipal and private enterprises are permitted when conforming to the uniform plan adopted for the course. Where protection against floods is involved the provinces, communities, industries, and farmers affected are assessed according to the advantage received.

Noteworthy examples of Government works are the Kosel transfer haven, the canalization of the Oder from Kosel to the Neisse with 12 locks, securing a continual water depth of 1.5 meters (4.92 feet), and the canal for large ships at Breslau (described above). The money for these three works (over \$5,000,000) was obtained by the law of June 6, 1888, authorizing a loan.

The city haven at Breslau, built (1897-1901) at a cost of 5,500,000 marks (\$1,309,000), is the most important illustration of municipal enterprise. It is located at the lower end of the channel for large ships. The expenses in the fiscal year 1906-7 exceeded the receipts by 183,240 marks (\$43,251), requiring an appropriation from the city treasury. The city haven at Neusalz, and the Teltow Canal, near Berlin (built by the county of Teltow), are other examples.

Examples of private enterprises on the Oder are the haven of the Frankfurter Gütereisenbahn-Gesellschaft at Breslau and Frankfurt, and of Caesar Wollheim, near Breslau.

In the case of protection against floods, private industries and farms receive a benefit, in proportion to which they are assessed to help pay the cost of the dikes. The Government may take the land necessary for such works under the right of eminent domain. Dike associations are chartered in the districts affected, and a Government commission, with an expert, works out the plan and the rate of assessment. State appropriations and loans lighten the burden. Since 1848, 57 dike associations have been chartered as "Meliorationsgenossenschaften." For example, the Deichverband Aufhalt-Glauchow diked 40 kilometers (24.85 miles) in 1866 at a cost, including drainage, of 1,048,515 marks (\$249,546), of which the State gave 200,000 marks (\$47,600). By 1906 the association's obligations were all paid off except 254,000 marks (\$60,452). The Deichverband Barteln-Scheitnig repaired and improved its dike after the flood of 1903 at a cost of about \$4,000, the State giving \$1,904, and lending \$1,842, the province giving \$204.

After the great flood of July, 1903, it was determined to improve and extend the entire dike system under the supervision of the Oder Navigation Commission, and the general plan of contribution agreed on was as follows:

1. The total cost not to exceed 60,000,000 marks (\$14,280,000).
2. The cost of measures of benefit to dike associations and public corporations to be borne by these to the extent of the benefit; where they are unable to contribute, or the cost exceeds the benefit, the province and the State are to aid.
3. The cost of measures of general interest to be borne by the province and the State, with the right to assess associations, etc., when these are benefited by the measure.
4. The province to pay one-fifth and the State four-fifths of the costs falling to their lot.

5. For changing Government works the State to pay all costs; for regulation measures between Kuestrin and Raduhn the State to pay down 7,000,000 marks (\$1,666,000) for dredging.

III. FLOATING EQUIPMENT.

(a) To the Oder system properly belonged 3,874 vessels in 1905, of which 3,039 were river boats (Segelschiffe), 563 canal boats, and 272 steamboats. Of the sailboats, 62 were also canal boats. The steamboats were classified thus: 92 passenger vessels (including 10 motor boats), 37 freight vessels (12 being also tugs), 137 tugboats, 1 motor boat, and 5 ferryboats. Of the passenger steamboats, 4 were freight and tug, 18 freight, 27 tug, and 2 ferryboats. Other boats, however, come in from other river systems, principally from the Elbe.

(1), (2) The upstream movement is almost exclusively by means of steam tugs. Sailing boats are found in small numbers below Frankfort and above Oppeln. Small sails are, however, frequently raised on towed boats to increase speed when the wind is favorable. The freight boats usually float downstream, although tugs are sometimes employed. On the uncertain stretch between Kosel and Ratiabor, where only smaller boats can ply, poles and pulling are brought into play.

(3) The following table shows the size and draft of the most frequent kinds of boats plying the Oder:

Popular name.	Capacity.	Average measurement.	
		Length.	Width.
	<i>Tons.</i>		
Finow boats.....	150 to 220	40 meters (131.09 feet).....	4.6 meters (15.09 feet).
16-footers.....	250 to 300	43 meters (141.07 feet).....	5.3 meters (17.38 feet).
Berliner.....	300 to 350	47 meters (154.2 feet).....	6.5 meters (21.32 feet).
Large boats.....	450 to 550	50 meters (164.04 feet).....	8.0 meters (26.24 feet).

The draft is up to 1.65 meters (5.41 feet).

Smaller boats, carrying less than 150 tons, enter the Oder through the Klodnitz Canal.

(4) The sailboats (in 1905) were all of wood, with the exception of 37 of iron. Of the steamboats, only 11 (3 passenger, 3 freight, 3 tug, and 2 ferries) were of wood; in the rest the principal material was iron.

(5), (6) The type oftenest seen is the Oder boat. It occurs in various sizes, nearly always of wood (generally pine or oak), though in recent years iron or partly iron boats have also been built for the lower Oder, mainly for use as towboats. The Oder boats are nearly all flat-bottomed with movable deck. The rigging consists of mast, pole, large sail, middle sail, storm sail, a fourth sail, and the necessary ropework. On the lower river some have sharp keels and stationary decks. From Breslau up, where the size is limited by the lock dimensions, the boats are flat-bottomed with pointed bows. Below Breslau the middle-size boats, 40 to 44 meters (131.23 to 144.36 feet) long, in part have pointed bows, in part round, bulging bows.

The latter, called Butzer, are mainly used as towboats. They move forward more easily and have a better capacity.

The Zillen, better known on the Elbe, are lightly built with small draft, e. g., a Zille 37.6 by 4.5 meters (123.35 by 14.76 feet) carries 75 tons and draws 1.1 meter (3.60 feet). Those on the Oder are usually built of deal or pitch pine, without a deck.

The Oder boats and Zillen are usually called Finow boats when they are of a size to pass the Finow Canal.

On the Warthe, with favorable water, large Oder and Elbe vessels (400 to 500 tons) come up to Posen, and ordinarily the Finow boats with as much as 200 to 250 tons.

(7) The highest number of loaded barges permitted to be towed upstream in one fleet is:

On the canalized Oder to the Neisse mouth, not to exceed 8 ship lengths.

On the Oder, below the Neisse to Nipperwiese—not to exceed 8 ship lengths.

On the Warthe and lower Netze, below the Drage mouth—8 vessels.

On the lower Netze, below the Drage mouth—5 vessels.

On the upper Netze, Bromberg Canal, and Brahe—2 vessels. Downstream the limit is in each case 2 vessels.

(8) The maximum dimensions allowed on account of the Oder locks are: Length, 55 meters (180.44 feet); width, 8.2 meters (26.9 feet); but a maximum draft has not been fixed, lest traffic be hindered in times of exceptionally favorable water conditions. The Oder has not a uniform flow like other German streams, but varies with the distribution of the precipitation, being more strongly influenced by the tributaries on the left than by those at the source. This and the strong fall in the upper length makes the stream most difficult to regulate and requires an unusual number of locks. As smaller boats have a relatively large draft, the usefulness of the boats depends mainly on the depth of the water, which is regularly ascertained at the numerous gauges and the vessel movement in uncertain periods is adjusted thereto.

IV. OWNERSHIP OF VESSELS AND BUSINESS ORGANIZATION.

(a) There are no canal companies or other waterway improvement companies, as such improvements are made by the State.

(b) There are a few cases of consolidation of vessel owners into corporations, such as the Viktoria Transportgeschäftselbständiger Schiffer and the Neuer Verfrachtungsverbandselbständiger Schiffer, both limited companies.

The government railroads do not own or operate vessels and producing and distributing concerns do so only in a few instances, as, for example, on the upper Netze, where the larger sugar, soda, and starch mills operate little steam launches to draw their boats.

(d) There are no merchant vessels owned and operated by public authorities.

(e) There are no combinations or monopolies controlling towing. A suggestion has been made for a government monopoly of towing on the large shipping canal in course of construction between Berlin and Stettin, but the idea meets with vigorous opposition.

V. TERMINAL FACILITIES.

(a) The most important inland terminals on the Oder are at Kosel, Breslau, and Kuestrin.

Kosel (Upper Silesia), the upper terminus of the large traffic, has three docks, the first opened in 1895, the second in 1903, the last in 1905. The first has a quay length of 450 meters (1,476.37 feet), to which 305 meters (1,000.65 feet) is being added.

Breslau has a municipal haven, covering 33.6 ha. (83.02 acres). Of the three docks planned only one has yet been built. It is 50 meters (164.04 feet) wide. The wharf length is 3,500 meters (11,482.9 feet). There are three large storehouses for grain, sugar, and fertilizers, an administration building, and a railroad station. The city powerhouse No. 2, near at hand, furnishes light and power.

(b) The most advanced methods are used at these havens for loading and unloading. Kosel's two new electric coal dumpers on the second dock protect the coal and can be operated also during high water. The first basin alone has 4 electric and 5 steam cranes and 6 old coal dumpers. The money has been granted for a new crane of 5 tons capacity. Breslau Haven has 22 cranes, 5 elevators, 3 spills, and 1 unloading apparatus for bulk goods up to 5 tons.

(c) The haven at Kosel has complete railroad connections. By working day and night it can transfer daily 12,000 to 13,000 tons of coal, over 500 tons of goods on the slides, and 3,000 to 4,000 tons with the cranes. The transfer in 1895 amounted to 10,700 tons, 927,000 tons in 1900, 1,570,000 tons in 1905, and 2,026,000 tons in 1908. It must be remembered that the average period of navigation between Kosel and Breslau is about 290 days.

The Breslau Haven has 2,000 meters (6,561.66 feet) wharf length with railroad connection and 1,500 meters (4,921.25 feet) without. The connection is complete with all roads.

(d) The terminals are owned by the Government, as in the case of Kosel, or by the city with state supervision, as in the case of Breslau and Neusalz. Private interests also own havens or loading places with the consent of the Government, and subject to its control; for example, that of the Frankfurter Gütereisenbahn-Gesellschaft, in Breslau and Frankfurt, and of Cæsar Wollheim, near Breslau.

VI. TOLLS AND FREIGHT RATES.

(a) Tolls are charged for passage through the canal and river locks. The elements considered in framing the tolls are the class of freight (usually four classes), kind of vessel, ownership, capacity (if empty), time (day or night), and preference. The toll is levied only on the cargo unless the boat is empty, then on the capacity. Vessels belonging to or serving the Empire or the State pass free. Passenger vessels pay according to the limit of passengers allowed by law. For passing boats outside of the regular hours or of the regular order of arrival, 50 per cent is added.

For example, on the upper Oder goods in the first class (such as cotton, coffee, fruit) pay 4 pfennigs, or 0.952 cent; in the second class (such as asphalt, lead, wool) pay 3 pfennigs, or 0.714 cent; in the third class (e. g., anthracite, cement, ice) pay 2 pfennigs, or 0.476 cent; and in the fourth class (e. g., brown coal, stone coal, oil cake, jute) pay 1 pfennig, or 0.238 cent, per metric ton of cargo carried.

(b) Towing rates at the entrance of the Oder-Spree Canal are prescribed by the Government under a contract with a steamer company, based on distance and loading capacity. Rates for horse towing on the Finow Canal (by the towing union) are based on distance and load. For example, towing into, on, or out of the Teltow Canal, one-half pfennig (0.119 cent) per ton of freight and kilometer (0.62137 mile) of distance, provided that the lowest fee collected shall not be less than the rate for empty vessels, which is, up to 250 tons capacity, 5 marks (\$1.19), between 250 and 400 tons 10 marks (\$2.38), and over 400 tons 15 marks (\$3.57).

(c) The Oder system has regular schedules of freight rates, which vary with available boat space, state of the river, etc., and are published weekly in the newspapers during the season. Above Breslau the river is continuously navigable, though with occasional difficulties, about 290 days in the year; below Breslau traffic is stopped only by high water (when bridges interfere), floods, and ice.

The regular classifications of freight are coal, bulk goods, sugar, cereals, and package goods.

(d) Way stations pay for part loads a rate at least proportionate to the rate to termini.

The rate is proportionately smaller for whole loads. Coal is carried at a lower rate than bulk goods, sugar, and cereals, while the rate for package goods is higher.

For example, the rate for heavy package goods in lots of 5 tons or more (exclusive of all costs such as customs, insurance, unloading) in pfennig (0.238 cent) per 100 kilograms (220 pounds) varies about as follows during the year:

From Kosel to Berlin 70-90, to Stettin 50-80, to Hamburg 85-150; from Breslau to Berlin 50-70, to Stettin 28-60, to Hamburg 55-100.

The ordinary rate from Breslau to Berlin for this class of goods is 50-55, to Stettin 28-30, to Hamburg 55-65.

(e, f, g, h) The Silesian railroads were taken into government ownership mainly because they were disinclined to comply with the wishes of the minister of public works for a lowering of the rates.

As the Government owns the railroads and is developing the waterways, the theory is that the two should be made to work together for the general good.

On the question of railway rates ream after ream of paper has been consumed by shipping interests, producers, city authorities, and others who deemed themselves discriminated against; but whether the Staatseisenbahnverwaltung has or has not done the best possible in the circumstances is a matter for experts.

VII. WATER-BORNE TRAFFIC.

The traffic on the Oder system consists in general of such freight as does not require speedy delivery. The principal commodities transported upstream are fertilizers, ores, grain, oil seed, fish, flour, rice, oil, petroleum, tar, asphalt, bricks. Downstream come coal, ores, worked iron, barley, hardwood, soft sawed timber, mill products, railway sleepers, rye, potatoes (from the Warthe), sugar, molasses, sirup, stone, metals, quarry stones, bricks, and cement. The downstream movement is several times larger than the upstream.

Volume 179, Part I, of the *Statistik des Deutschen Reiches*, gives complete statistics of vessel movement and traffic on the Oder system for the last 10 years, with much other valuable information.

RIVERS AND CANALS IN THE CONSULAR DISTRICT OF STETTIN.

Report by WILLIAM C. TEICHMANN, *Consul.*

I. PUBLIC SUPERVISION.

(a) The Prussian Government exercises supervisory control over all navigable streams and canals in my district. All improvements are conducted by the Government along the water route, but at the various harbors of cities located on the route the respective municipalities often share with the Government the expense of the maintenance of the waterway, and in some instances the former will bear the entire financial burden of improvements. All work of this kind, however, is subject to supervision by the Government in accordance with the constitutional rights involved and termed "Staatliche Hoheits-Aufsicht." The same relation between Government and municipality obtains regarding the policing of all waterways. A board of 18 general councillors, "Gesammt-Wasserstrassen Beirat," with 6 subdistrict boards, conducts the general supervision.

(b) The Government or municipality is not connected with the navigation corporations, which are entirely private, and the capitalization of which is subject to the general corporation laws of Prussia and Germany.

There is no governmental or municipal regulation of freight rates. Competition between railways and waterways is unrestricted.

The president of the province (in this instance the president of the Provinz Pommern), called "Regierungs-Praesident," as the responsible head of the department of waterways, termed "Chef der Verwaltung von Wasserstrassen," supervises the collection of waterway statistics for presentation, at regular intervals, to the Government, which publishes them at its discretion. Much data relative to waterways, however, are also collected and published by municipal bodies of the cities located on the route.

II. WATERWAY IMPROVEMENTS.

(a) There is no established policy as to water power developed by works constructed for improving navigation.

(b) For Prussia the established policy regarding improvements of waterways until 1900 has been for the Government to pay, by appropriation, one-third of the costs and to require the province through which the waterway passes and landed interests united in associations to cover the remainder of expenditures, including also the cost of maintenance. In 1900, on the occasion of high water

in the rivers of Silesia the Prussian Government conceded a more liberal participation of the State in this expense, and in 1904, when the improvement of the lower Oder and the Havel and Spree rivers, in connection with the projected waterway for 600 metric-ton boats from the Baltic Sea, via Stettin to Berlin, necessitated radical concessions on the part of the Prussian Government, the latter granted the payment of four-fifths of the amount required for this great improvement. In addition thereto the Government assumed the expense for the construction of all required buildings along the route, and also the larger part of the future cost for the maintenance of this waterway. In the bill introduced by the Government in the Prussian legislative body, called the "Landtag," it is stated expressly that this liberality did not commit the Government to the principle of assuming, as a rule, such a large percentage of the costs for waterway improvements, and it is there emphasized that only the exigencies incidental to the demand for a waterway of the kind projected for the route (Stettin-Berlin) had induced an exceptional deviation from the established policy of national disinclination to appropriate funds for waterways which should be principally furnished by the provinces and their shipping interests through which the respective water route passes or is to be conducted.

The present waterway connecting Berlin with Stettin has a length of 193.4 kilometers (120.172 miles), of which 85 kilometers (52.816 miles) are covered by the River Oder from Stettin to the town of Hohensaathen. For this section the above-mentioned bill designated an appropriation of 41,865,800 marks (\$9,964,060), and for the rivers Havel and Spree connected with the projected waterway, 18,954,200 marks (\$4,491,099).

The remaining section of the present waterway from Hohensaathen to Berlin is largely composed of the Finow Canal. This canal only enables water craft carrying less than 150 metric tons to pass through. Therefore another great improvement is to result in the floating of craft on an entirely new canal carrying boats with a capacity up to 600 metric tons (661.38 American tons) of freight. The cost of this improvement was estimated at 43,500,000 marks (\$10,353,000), approximately for each kilometer (0.62137 mile), 435,000 marks (\$103,530). The normal Oder barge, carrying 600 kilograms, which is to pass through the new canal, has a length of 65 meters (213 feet 3 inches), a width of 8 meters (26 feet 3 inches), and a draft of 1.75 meters (5 feet 7 inches) fully loaded. The dipped cross section of 8 by 1.75 feet corresponds technically to the canal cross section as 14:59 or 1:4.2.

A reduction in freight expense for the distance, Berlin-Stettin, as a result of the opening of the new canal is estimated by the Board of Trade for Stettin and Berlin, amounting to 70-75 pfennigs per metric ton (\$0.1666 to \$0.1785 per 1.102 American ton weight).

The annual figures for the traffic passing through the present Finow Canal average 1,000,000 metric tons (1,102,310.6 American tons). Governmental and Stettin Board of Trade calculations predict an immediate increase to 2,000,000 tons (2,204,621.2 American tons) and a steady growth subsequently because of increasing trade both ways.

The cities of Berlin and Stettin have agreed to contribute each one-half of the annual cost of the maintenance of the new canal, the figure of this yearly expenditure amounting to 655,000 marks (\$155,890), and to cover one-third of the 3 per cent interest on the building capital of 43,500,000 marks, after deduction of revenue from the tolls and dues of the waterway.

The annual cost for the city of Stettin is estimated as follows:

Maintenance of canal, including expense of management and current repairs	Marks.
Interest on 43,500,000 marks, at 3 per cent	655,000 (\$155,890)
	1,305,000 (310,590)
	1,960,000 (466,480)
Canal revenues	1,310,000 (311,780)
Annual expenses, total	1,960,000
Revenue	1,310,000
Deficiency	650,000 (154,700)

Of this deficiency Berlin and Stettin would have to cover 216,667 marks, representing one-third; accordingly Stettin contributes 108,333.50 marks, and after deducting an annual contribution of 10,000 marks from the provincial government of Pommern, there would remain an annual amount of 98,333.50 marks (\$23,403.37), which the city of Stettin would probably have to contribute to this great navigation improvement every year.

There is not much difference in the distance from Stettin to Berlin between the old and new route. The old Finow route has a length of 194.4 kilometers and the new route will be 186.2 kilometers (115.7 miles, English). The great benefit expected from the improvement is the cheapening of freight rates as already referred to, which is calculated to bring back to the Oder River and Stettin the formerly very important water traffic now diverted to the river Elbe by canal connections with this great German waterway and by corresponding Elbe River improvements. The trade between Berlin and Stettin by the Finow Canal route figured as follows during the years 1902-1906:

	To Berlin.		From Berlin.	
	Metric tons.	A m. tons.	Metric tons.	A m. tons.
1906	927,286	1,022,157	309,606	341,282
1905	1,019,848	1,124,189	265,222	292,357
1904	1,050,849	1,158,362	241,863	266,608
1903	668,828	737,256	280,175	308,840
1902	654,758	721,747	259,621	286,183

The Chamber of Commerce (or Board of Trade, which are identical here) of Stettin estimates the following as the minimum traffic of the new waterway when opened in 1913: Stettin-Berlin, annual average 1,870,000 metric tons; and Berlin-Stettin, 700,000 metric tons. On April 1, 1905, the above-mentioned bill became a law and in addition to the already existing waterway (which furnished a water route from Stettin to Berlin for boats and barges not exceeding 150 metric tons (330,690 pounds avoirdupois) the construction of a new one for vessels carrying 600 metric tons (1,322,760 pounds avoirdupois).

pois) has since been in progress. It will be completed in a few years. Its construction and subsequent management rests with one of the six subboards of Prussian waterway councilors, viz, that for the Grossschiffahrtweg Berlin-Stettin."

This board is composed of 25 members, the president (Regierungs-präsident in Potsdam), his substitute, a high official entitled "Oberbaurat," two representatives each for the boards of trade at Berlin and Stettin, one for the boards of trade at Frankfurt on the Oder and Potsdam, one each for the Berliner Schiffahrtverein, the Pommerscher Binnenschiffahrtverein of Stettin, and the "Bund deutscher Schifferinnungen" in Fuerstenwalde on the Spree; two each for "Landschaftskammern," of the provinces of Brandenburg and Pommern, and the dike associations of Brandenburg and Pommern, one each for the provincial corporations of Brandenburg and Pommern, for the city of Berlin and for the city of Stettin. Every vacancy is immediately filled by a substitute already selected.

The Government provides all the experts required and has the right to carry out improvements and police the waterway independent of previous sanction by the board, but must subsequently inform the board of such action. All members are elected for three years. They receive remuneration for every day of the board's session to the amount of 15 marks (\$3.57) per diem and traveling expenses (mileage). After the completion of this waterway it is contemplated to reduce this board in membership somewhat. The board is to meet at least once a year.

A detailed statement of the rights, duties, and privileges of this board is contained in the pamphlet published by the Royal Prussian Waterway Commission entitled "Bestimmungen betreffend die Wasserstrassenbeiräte, Zusammenstellung Mai 1908. Berlin, Gedruckt in P. Stankiewicz's Buchdruckerei."

III. FLOATING MATERIAL.

(a) 1. Regarding the relative use of self-propelled vessels and towed vessels only tugs come into consideration for the former class and barges for the latter so far as the inland traffic on the river Oder from Stettin is concerned. The law now allows fleets of eight boat lengths of the size described above for certain sections and six for others. Fleets of a metric tonnage of from 2,500 to 3,000 are of frequent occurrence and are drawn by tugs of 200 horsepower with a draft of 1.50 meters (4.92 feet). On the river Oder stern-wheel steamboats having a draft of 1 meter only (3.3 feet) are also much seen. It is contemplated to run tugs through the new canal which have 500 horsepower and yet only a draft of 1.50 meters (4.92 feet).

2. The barges have no motor power and are drawn by the tugs above mentioned.

3. Size and draft of vessels are given above.

4. All the barges are of wood construction.

5. Cost could not be ascertained.

6. There is no difference in the type of the barges. There are closed and open barges, however.

7. The size of fleets is given above.

8. The type of the barges is the same in general, as they are all constructed for the 150-metric-ton limit of freight.

IV. OWNERSHIP OF VESSELS AND BUSINESS ORGANIZATION.

(a) There are no waterway improvement companies that own and operate vessels. These are all owned either by shipping corporations of private character or by individuals. Innumerable barges are owned and run by those who operate them and join in fleets with others for certain trips up the Oder River. They are drawn by tugs furnished by the shipper at the starting point.

(b) Consolidations of vessel owners only occur occasionally. These are the "Fluss-Rhederei-Gesellschaften," incorporated as stock companies.

(c) Railroads do not own or operate river or canal boats or any of the vessels in my district. Industrial concerns do not own tugs or barges either. They sometimes contract on a large scale with the above-mentioned "Fluss-rhederei-Gesellschaften" or with individual owners of fleets of barges.

(d) No fleets are operated or owned by public authorities.

(e) Not in my district.

V. TERMINAL FACILITIES.

(a) The striking features of the river and railroad terminals of the city of Stettin are the wonderful and model unification of both, with connections between both which could not be improved upon. The city a few years ago expended 18,000,000 marks (\$4,284,000) on harbor and dock improvements. An exhaustive description of the technical features of these improvements is contained in the official publication prepared and issued by the municipal authorities of Stettin in 1906 and entitled: "Stettin als Handels-und Industriplatz."

(b) I refer to the above-mentioned publication for the technical feature of loading and reloading vessels. Illustrations in this book give a good idea of the mechanical machinery used for said purposes, claimed to be of the most advanced European order.

(c) Railroad tracks do connect terminals, running close up to the docks so as to enable direct loading from railroad car to ocean steamer, river boat, or barge and vice versa. A belt railroad completing all connection has been added to the perfect system of terminal facilities.

(d) The terminals are owned partly by the city and partly by the Government, but largely by the former. No part of this system is owned by private parties.

(e) A list of dockage fees and other terminal charges could not be obtained. These charges are comparatively high but do not exceed the normal charges of other German ports.

VI. TOLLS AND FREIGHT RATES.

(a) Tolls are charged for canals and rivers. Tolls for the latter are paid at the harbors and are better termed harbor dues. They are municipal and cover the regular services connected with harbor traffic such as pilotage, lighterage, etc., and are based upon the cost of municipal harbor expenditures including these services, and also upon the cost of the maintenance of harbor improvements. There are 16

different classifications of such dues for the Stettin shipping traffic by waterway. A specified table is published in the above-mentioned book on Stettin, on pages 128-131. It will be seen therefrom that these dues are so high as to rank with the highest collected in other German ports. The reason for this policy is the enormous cost of the Stettin harbor improvements and the constant expense involved in the maintenance of the capacious free harbor "Freihafen" for inland shipping. An elaborate and technically minute account, with various illustrations from original photographs, is contained in the above-mentioned book on Stettin, relative to the construction of the Stettin harbor, the "free" port, quays, cofferdams, docks, terminals, cranes for loading and unloading, etc., and can be found on pages 49 to 120.

Regarding tolls exacted on this canal, the following table is given:

Tolls paid for present canal (Finow Canal).

[Distance, 105 kilometers.]

	Pfennigs.	Marks.	Dollars.
Freight of Class I.....	40	0.40	0.0952
Freight of Class II.....	32	.32	.07616
Freight of Class III.....	24	.24	.05712
Freight of Class IV.....	16	.16	.03808

This calculation is based on pfennigs per metric ton-kilometer, which would be:

	Pfennigs.	Marks.	Dollars.
Freight of Class I.....		0.38	
Freight of Class II.....		.30	
Freight of Class III.....		.23	
Freight of Class IV.....		.15	

Tolls contemplated for new canal (as per governmental announcement).

[Distance, 100 kilometers (62.137 English miles.)]

	Pfennigs.	Marks.	Dollars.
Freight of Class I.....	60	0.60	0.1428
Freight of Class II.....	50	.50	.1190
Freight of Class III.....	40	.40	.0952
Freight of Class IV.....	30	.30	.0714

This calculation is based on pfennigs per metric kilometer, which would be:

	Marks.
Freight of Class I.....	0.60
Freight of Class II.....	.50
Freight of Class III.....	.40
Freight of Class IV.....	.30

It is calculated that the relative proportion of freight traffic in the new canal will be according to classification:

	Per cent.
Freight of Class I.....	19
Freight of Class II.....	15
Freight of Class III.....	6
Freight of Class IV.....	60
Total.....	100

Additional tolls, of very small importance, however, and yielding less than one-tenth of the amount collected as represented in above table, are exacted for locks and sluices principally, and also to a very small extent for empty vessels, tugs, passenger boats, rafts, small rowboats, etc.

The entire revenue expected annually from the new canal is figured by the Government at 900,000 marks, to which must be added, according to Government estimates, 410,000 marks revenue from tolls still collected from the old Finow Canal, which is to remain in operation for smaller craft, so that the total revenue of 1,310,000 marks (\$311,780) is expected from 2,000 000 metric tons traffic in the new and 1,000,000 metric tons traffic in the old canal, equaling 2,204,621.2 and 1,102,310.6 American tons respectively.

There are no separate tolls collected for boats and cargo only empty boats or passenger boats paying toll as such.

(b) Towing rates are regulated according to the supply and demand for towboats. The larger the demand for some the higher the rates and vice versa. There is no Government control and competition is free to cut or raise rates, and since there is no agreement between the competing companies or individual owners tug rates fluctuate very much. These conditions only refer to my district, however, the conditions of which are alone under discussion in this report.

(c) Inland water lines do not have regular schedules of freight rates which are strictly adhered to. Rates are not stable and vary according to competition and supply and demand. At times when the traffic calls for plenty of vessels rates go up. Scarcity of barges for traffic on the lower river Oder from Swinemünde, the seaport of Stettin, down to Silesia, is not infrequent, and then when the shipping business slackens down again rates will drop considerably. Nevertheless I am able to give the following water-route rates from Stettin up the river Oder and thence by canal farther inland as normal and representing a fair average. They have been compiled by and checked up by the largest trading houses of Stettin and give a good idea of prevailing rates. Transportation in barges carrying 170 metric tons (274,782 pounds avoirdupois) :

Stettin to Berlin.—Distance, 193.4 kilometers (120.172 miles, English) by water. Average rate at present for coal and for ore, varying from 24 to 30 pfennigs (\$0.0571 to \$0.07) per 100 kilograms (220.46 pounds avoirdupois).

For stone, same rates.

For fertilizers, per 100 kilograms (220.46 pounds), 30 pfennigs (\$0.07).

For wood (lumber), per cubic foot, $6\frac{1}{2}$ pfennigs (\$0.0155).

For grain, per 100 kilograms (220.46 pounds), 26 to 28 pfennigs (\$0.062 to \$0.067).

Stettin to Breslau.—Distance, 350 kilometers by rail (217.48 English miles), water route transportation as above. Average rate at present for coal and ore, when in large shipments, 35 pfennigs (\$0.083) per 100 kilograms (220.46 pounds).

For stone, same rates.

For wood (lumber), per cubic meter (35.26 cubic feet), 3 marks (\$0.714).

For fertilizers, per 100 kilograms (220.46 pounds), 40 pfennigs (\$0.095).

For grain, per 100 kilograms (220.46 pounds), 35 to 37 pfennigs (\$0.083 to \$0.088).

Stettin to Cosel (Oderhafen).—Distance, 485 kilometers by rail (301.35 miles), water route transportation as above. Average rate at present for coal and ore, 48 to 50 pfennigs (\$0.1142 to \$0.12) per 100 kilograms (220.46 pounds).

For stone, same rates.

For fertilizers, 60 pfennigs (\$0.1428) per 100 kilograms (220.46 pounds).

For grain, 55 to 57 pfennigs (\$0.13 to \$0.1356) per 100 kilograms.

For wood (lumber), per cubic meter (35.26 cubic feet), 4 marks (\$0.952).

(d) 1. Inland water rates are affected by distance of haul, the longer distance reducing the rate proportionately, viz:

Stettin-Berlin.—Coal rate per 100 kilograms, \$0.0571 to \$0.07. Distance, 120.172 miles by water and 84 miles by rail.

Stettin-Cosel.—Coal rate per 100 kilograms, \$0.12. Distance, 301.35 miles by rail. Same relative rates for iron ore and stone.

Stettin-Berlin.—Fertilizer rate per 100 kilograms, \$0.07.

Stettin-Cosel.—Fertilizer rate per 100 kilograms, \$0.14.

Stettin-Berlin.—Grain, \$0.062.

Stettin-Cosel.—Grain, \$0.13 to \$0.1356.

2. Quantity of commodity also affects the rates, larger shipments bring proportionately cheaper rates.

3. Speed does not affect rates. Mode and time of transportation are quite uniform, because fleets will go direct to destination and shipments are arranged accordingly.

4. Character of commodity influences rates in general so far as perishable and inflammable and other damageable goods are concerned, which call for a materially higher rate. For preferential rates commodities are divided into three "special tariff" classes (for rail and water routes):

Class I.—Manufactures and goods including such as raw sugar, paper, oil cakes, pasteboard, clay and lime articles, etc.

Class II.—So-called "halb-fabrikate," half-finished manufactures.

Class III.—Raw products and materials.

All seaports of Germany have preferential rates for certain commodities, principally for raw materials, by rail to inland points, which rail rates lower the difference between rail and water rates but do not bring the rail rates down to the low level of the water-route rates.

(e) Prorating arrangements do not exist between water lines and railroads, the former being private and the latter governmental; rate pools are out of question, as no laws exist which enable the Government to undertake such a regulation of rates.

(f) Inland water rates do not affect railway rates as yet, but there appears a desire on the part of government railway interests to strengthen the competitive power of the railroads against the growing competition of the waterways, which has resulted in decreasing the revenues of certain railroad lines particularly affected by the

canal legislation of Germany during the past decade. This movement is growing, and since it is based upon a material reduction of the State's revenue derived from the government railways, legislative action will either develop in the direction of acquisition of traffic control of the waterways by means of control of the canals, or if this traffic on the waterways remains financially too profitable to private interests "state" reasons will lead to legislation empowering the government railroads to "compete" with the waterways by preferential rates, with discretionary application in the interest of the railroad revenue.

Inland water rates competing with railway rates have not brought about any lowering of railway freight rates as yet, and the latter are not higher, comparatively, to interior nonwater points than to points also reached by the water route.

Comparing inland water rates with paralleling railway rates the following figures show that the former are lower than the latter:

Stettin-Berlin, per 100 kilograms (220.46 pounds).

[Distance, 120.172 English miles.]

	Coal.	Iron ore.	Grain.	Fertilizers.
Water route.....	\$0.0571 to \$0.07	\$0.0571 to \$0.07	\$0.062 to \$0.067	\$0.07
Railway.....	.10	.08	.1737	.08

I have taken for comparison bulk freight, because this is the principal freight shipped by water line. Piece-goods freight goes by rail preferably because more quickly transported and delivered. It is asserted in some quarters that railway freight rates are lower for carload shipments than by waterway, but this does not appear from the data at hand, and for both short and long distances railway rates still exceed waterway rates in general. It must always be considered that the railway rates are of a fixed character determined by the "tariff commission," and are not capable of being adjusted to changing conditions, as the waterway rates are, unless said commission orders a revision.

(g) Notwithstanding the growing competition between rail and water lines, the railway interests have not thus far attempted any understanding with the water route or with private competing parties relative to said competition, and no agreements for the division of traffic have been proposed or even discussed as yet. Not one example of this kind has come to my notice, although I have made careful inquiries regarding same in my district.

(h) 1. No legislation is in existence regulating the relations between rail and inland water systems of transportation.

2. There is no governmental restriction on the lowering of rail rates in competition with water rates.

3. It is a general custom for the shipper to insure the merchandise, as the carrier need not assume the risk.

4. If, in exceptional cases, the shipper desires the carrier to cover the insurance the carrier can do this and, being at liberty to fix his rate, then will determine the rate, so that it includes the insurance.

VII. WATER-BORNE TRAFFIC.

(a) The subdistrict of the province of Pommern under my immediate control, has only one navigable waterway, the river Oder. This river runs through the provinces of Pommern, Brandenburg, and Silesia, of the Kingdom of Prussia, into northern Austria. It connects Stettin and its seaport Swinemünde directly with a large number of important trade centers in middle and southeastern Prussia, such as the cities of Frankfurt on the Oder, in Brandenburg, and Breslau, in Silesia. Furthermore the Oder connects Stettin by water route of branch rivers and canals with various other large trade centers; for instance, Magdeburg and Dresden, on the River Elbe; Bromberg and Posen, in Eastern Prussia; and Berlin, by the Finow Canal, as already described.

Stettin is the largest Prussian port and the most important one of all the Baltic ports. Its trade with Scandinavia, Russia and Denmark is very large, and of formidable character also with Great Britain, Netherlands, Belgium, France, the United States and other countries, to which the distance has been materially shortened by the new ship canal connecting the Baltic with the North Sea. The excellent water-route facilities existing in Germany, together with the prospective opening of the new canal connecting the Oder and Stettin with Berlin for 600-metric-ton vessels, will increase the importance of Stettin as a great trading terminus by sea and inland waterway.

Regarding the relative proportion and character of the inland waterway traffic of Stettin, the year 1908 shows the entry of 916,211 metric tons of merchandise at this port, of which sugar alone represented nearly one-sixth, coal one-twelfth, grain one-fifteenth, coal briquette one-nineteenth, flour and foodstuffs one-nineteenth, zinc one thirty-fifth, lumber one fifty-fifth, and other articles following in still smaller percentages.

During this same period (1908) 1,616,086 metric tons of freight left the port of Stettin by inland waterway, of which coal represented nearly one-third, herrings one-seventh, ore one-eighth, boards one-fifteenth, other lumber one twenty-third, pyrites one twenty-sixth, petroleum one twenty-ninth (all of American origin), crude phosphate of lime (all of American origin) one thirty-first, paving stone one-twelfth, pig iron one twenty-fifth, cement one thirty-ninth, fertilizer one one-hundred-and-fifty-eighths (made from American phosphate of lime), and other commodities in smaller proportions.

By far the larger percentage of this freight was carried in bulk, the package freight being comparatively small. The herrings were all transported in barrels, however.

(c) As to the question whether local or other traffic predominates on the water route, it can be stated that the traffic, as described above, is predominately transit, in harmony with the character of a port like Stettin, although local manufacturing is growing and accordingly increasing its share in the above traffic steadily.

(d) To analyze the "typical conditions of labor employed in navigation and in terminal handling, particularly with reference to wages paid," presents a problem difficult to solve if reliable data are to be presented and true conditions to be described. I regret that

my sources of information have as yet not yielded satisfactory results in this respect.

The labor involved is of a variegated character. While the employees connected with the terminals in the cities are more permanently engaged and their wages regulated, much of the ordinary labor at the docks is "day labor," the wages of which are constantly fluctuating according to supply and demand. In regard to labor employed in navigation, similar conditions obtain. Here the wages paid show a wide variation, caused by the different classes and grades of labor accepted by the employers, similar to the scale in American ports, from the regularly working employee provided with papers of good record down to the roustabout taken temporarily for the lowest pay in the labor market.

The better class of dock and harbor labor in this port is organized, as in other cities, and endeavors to secure scales of wages fixed by the "union." Strikes are therefore not infrequent, although there is none on record here of recent date. The scarcity of labor existing during crop months in the agricultural districts does not appear in this city, and there is always plenty of supply on hand to fill the ordinary demands for navigation purposes, inasmuch as it is not organized, whereas terminal labor is controlled down to the dock laborers by the organizations.

RIVERS AND CANALS IN BADEN.

Report by ERNEST L. IVES, *Vice-Consul at Mannheim.*

I. PUBLIC SUPERVISION.

(a) The supervision over the Rhine and Neckar is by the Rheinbau Inspection of Mannheim. This extends for the Neckar as far as the boundary of Baden, and for the Rhine, over a certain district. This supervision is subject to a higher authority, that of the committee of waterways and streets at Karlsruhe.

(b) 1. There are no navigation corporations in this district. The department of interior has control of the rates that are paid out for towing on the Neckar. The Rheinbau Inspection has control of the reports of operation. Maintenance and improvement are controlled by the State.

II. WATERWAY IMPROVEMENTS.

(a) In 1901 Baden, Bavaria, and Alsace-Lorraine entered into an agreement for the improvement of the Rhine, and in accordance with this agreement, the channel of the river is being deepened between Strassburg and Sonderheim, a distance of 114 miles. At the end of 1907 the depth of the channel at Maxau was 9 feet. The total cost of this undertaking is estimated at \$3,204,451.

According to the agreement, Bavaria was to pay the sum of \$190,000, and the remainder will be paid by Alsace-Lorraine and Baden. The city of Strassburg pays \$166,600 of the cost to be met by Alsace-Lorraine, and Baden is to receive \$238,000 from certain interests in Alsace-Lorraine.

(b) The expense of improving the Rhine has been borne by the States through which it flows, namely, Baden, Alsace-Lorraine, Bavaria, Hessen, Prussia, and the Netherlands.

For the year 1907 the cost was as follows:

Baden	\$125,843.21
Alsace-Lorraine	111,230.97
Bavaria	23,303.53
Hessen	50,401.02
Prussia	284,401.11
Netherlands	240,083.93
Total	835,263.77

The cost to the State of Baden was divided as follows:

1. Maintenance.

1. Maintenance of towpaths, banks, straightening and regulating the stream, including planting trees, etc.	\$22,270.93
2. Maintenance of channel (dredging and blasting, etc.)	386.75
3. Removal of sunken vessels	48.98
4. Construction supervision (exclusive of salaries, cost of soundings, maintenance of machinery, etc.)	14,466.47
Total	37,179.13

2. *New construction.*

1. New banks and correction of streams-----	\$12,332.99
2. Completion of work on banks and correction-----	58,516.95
3. Additional construction for completion of correction work-----	3,406.22
Total-----	74,255.16

3. *Protection of banks.*

1. Stonework along banks-----	39.90
Total cost for year-----	111,474.19

III. FLOATING EQUIPMENT.

(a) The most prevalent type of boat is the side-wheeler steam-boat. No boats with rear wheels are used. The screw tugs are used, but the greatest amount of freight is carried in barges drawn by side-wheelers. There are also screw steamers which carry freight.

1. The self-propelled boats are generally used for carrying freight and towing purposes. According to their uses, the boats were divided as follows:

	Number.	Per cent.
Passengers or freight traffic.....	69	6
Passenger traffic.....	87	7
Freight traffic.....	204	16
Towing barges.....	877	69
Various purposes.....	35	2

Steam is generally used for power. There are some small motor boats. In 1907 there were 10 in Baden. In Prussia there were 129 motor boats, with 1,355 horsepower, used on the Rhine. On the Rhine tributaries there were 27, with 356 horsepower.

2. Some barges are poled downstream, but this is exceptional, as they are usually towed.

3. The side-wheelers have a length of from 45 to 75 meters, width of from 5 to 20.5, and a depth of from 1 to 1.25 meters. The engines are from 100 to 700 horsepower.

The screw steamers have a length of from 45 to 80 meters, a width from 6.5 to 10, a depth of from 2 to 2.5 meters (when loaded), and the engines are from 350 to 650 horsepower. They have a cargo capacity of from 240 to 1,320 tons.

The barges are from 56 to 85 meters long, 6.7 to 11 meters wide, when loaded a depth of 1.75 to 2.5 meters, and a carrying capacity of from 450 to 1,700 tons.

4. Of the 9,262 barges and sailboats, 5,856 were iron, with a capacity of 3,025,720 tons, and 3,406 were of wood, with 531,946 tons carrying capacity. In 1896 the number of iron barges of more than 1,000 tons capacity was 277; in 1906 this had increased to 890, while the number of wooden barges of over 500 tons capacity had decreased from 17 to 6 in the same period.

Some of the largest iron barges are:

	Length.	Width.	Depth.	Capacity.
	Meters.	Meters.	Meters.	Tons.
Richard IV.	102	12.6	2.75	2,615
Leopold Marianne II.	100	12	2.75	2,340
Rees.	102.5	11.6	2.75	2,286
Mannheim 60.	88.2	12.1	2.66	2,062

5. The cost of various types of boats are as follows:

BARGES.

Tons.	Length.	Width.	Depth.	Cost.
	Meters.	Meters.	Meters.	
200.	43	6.2	1.2	\$4,712
300.	46	6.65	1.6	6,235
400.	54	7.5	2	8,039
600.	56.5	7.6	2.1	10,329
1,000.	67	9.1	2.3	13,780
1,200.	76	10	2.2	15,279
1,500.	85	10.4	2.5	17,063

STEAMBOATS—SIDE-WHEELERS.

Horsee power.	Length.	Breadth.	Depth.	Cost.
	Meters.	Meters.	Meters.	
800.	68	8.2	1.2	\$76,000
1,000.	75	8.6	2	85,000

SCREW BOATS.

140.	19	4.7	1.5	\$11,000
200.	20	5	1.5	12,000

TWIN-SCREW BOATS.

600.	38.85	7	1.75	\$37,000
750.	40	7.25	1.35	41,000
900.	47	7.80	1.20	40,000

6. Barges are generally used for the transportation of coal, iron, ore, sand, wheat, lumber, stone, etc. Although in some cases goods are transported by large steamers.

7. The number of barges in a fleet vary according to the depth of the water and the power of the tug. The number carried in low water is usually three; high water, eight; and the average number is five.

8. The lowest depth with which traffic can be maintained by large boats is 1.3 meters. The boats are built with a view to utilizing high or low water.

IV. OWNERSHIP OF VESSELS AND BUSINESS ORGANIZATION.

(a) There are some companies that own and operate vessels on the Rhine and Neckar, and among the most important of these are the following: Bad. Artiengef., E. Flaskamp, Heilbronner Schiffahrts-

Kommissariat, Rol. Küpper & Co., Rheinische Transport-Gesellschaft, William Egan & Co., etc., at Mannheim.

(b) There has been consolidation of companies, but not to any great extent.

(c) There are no vessels owned and operated by the railroad.

(d) There are no fleets or merchant vessels owned by public authorities.

(e) There are no monopolies to any extent.

V. TERMINAL FACILITIES.

(a) There are harbors at Kehl, Karlsruhe, Rheinau and Mannheim. These have all been built by the State except the one at Rheinau, which was constructed by a private company, but under government control.

The harbors at Mannheim are the principal ones. These were first in use in 1840, but the increased traffic made a constant demand for more space and up to 1865 the cost had amounted to over \$665,000. From 1865 to 1902, the total cost of harbors as well as railway stations and light and power equipment amounted to about \$5,000,000.

In addition to these the city of Mannheim has constructed the "Industriehafen" at a cost of about \$1,850,000.

The harbors in Mannheim have a wharfage of 25,500 meters, of which about 5,000 are masonry.

(b) There are 112 cranes, of which 62 are operated by steam; 49 are electric, and 1 hand crane.

(c) There are about 17 miles of railway tracks along the harbors and the facilities for transferring goods from boat to train are the very best.

(d) The river terminals are owned by public and private companies. However, the railroads own property in many cases where the tracks are laid.

VI. TOLLS AND FREIGHT RATES.

(a) There are no tolls for the use of waterways.

(b) In the Neckar there is laid a chain from Mannheim to Heilbronn, having a length of 70 miles. This is picked up by tugs, over which it runs on wheels. These tugs have 110 horsepower and are able to draw upstream five to ten barges with a cargo of 300 tons each.

(c) The rates for carrying freight vary according to the stand of the water as well as the kind of goods. For the year 1908 the rates from Rotterdam to Mannheim for loads of from 600 to 800 tons were as follows:

	Per 4,400 pounds.
January-----	\$2.02
February-----	2.02
March-----	1.43
April-----	1.43
May-----	1.31
June-----	1.55
July-----	1.90
August-----	2.62
September-----	3.57
October-----	4.28
November-----	4.05
December-----	2.98

(d) 1. The distance has very little effect on water rates. For instance, the distance from Rotterdam to Cologne is 110 miles, and to Mannheim is 354 miles, but the rate on the same class of goods to Mannheim is but 48 cents more than to Cologne.

2. The rates vary according to quantity of commodity offered.

3. The rates also vary according to speed.

4. For boat loads of grain or coal the rate has been as low as 90 cents for 4,400 pounds, and as high as \$2.68. The rate by rail for coal is \$5.57 and for grain is \$8.75 per 4,400 pounds. The distance from Rotterdam to Mannheim is 298 miles. The cheapest rate is for ore and sand, which is \$2.43 per 4,400 pounds; for the highest class freight it is \$17.95 for 4,400 pounds.

The rate for such goods as coffee, tobacco, rice, cotton, etc., in boats is from \$2.14 to \$2.86 per 4,400 pounds.

The rates for freight on passenger boats are: Small shipments, \$5.70; shipments of 110,000 pounds, \$5.42; shipments of 220,000 pounds, \$5.14 per 4,400 pounds.

(e) There are no agreements between water tariffs and railway tariffs.

(f) The railway rates in no way affect the water rates.

(g) There are no agreements between rail and water lines in regard to division of traffic.

(h) There is no legislation regulating the system of transportation between rail and inland waterways.

There is no Government restriction in regard to the rail and water rates.

It is customary for the shipper to insure the goods, but this does not affect the freight rate.

VII. WATER-BORNE TRAFFIC.

(a) The following list shows the most important goods handled and the amount of each:

	Tons.
Coal	6,904,164
Iron ore	5,742,049
Earth, sand, etc.	3,638,063
Wheat and spelt	1,795,810
Lumber	799,667
Barley	449,593

The total amount of traffic on the Rhine for 1907 was 64,505,058 tons, an increase of 7.4 per cent over 1906. The amount in the German harbors on the Rhine in 1897 was 21,400,277 tons, and in 1907, 41,476,834 tons, showing that the traffic had almost doubled in 10 years.

Of the 41,476,834 tons carried, 28,937,168 tons were upstream and 12,593,666 tons were downstream. The amount at Mannheim was 6,095,924.

In 1907 there were 223 rafts, amounting to 45,181 tons, received at Mannheim. In 1896 there were 668, with a weight of 127,199 tons. These all came down the Neckar. The total traffic on the Rhine tributaries, Neckar, Main, Lahn, Mosel, Ruhr, and Spoy Canal, amounted to 3,195,971 tons in 1907, and of this amount 2,197,827 tons were from the Rhine to the tributaries.

During 1907 there were 79,918 boats passed the German boundary on the Rhine, of which 57,225 were sailboats or barges. The number of unloaded barges was 13,757, or 24 per cent. The number of boats leaving Strassburg and Kehl, the head of navigation on the Rhine, were 1,758, of which 598 were steamboats. The number leaving Mannheim and Ludwigshafen, the head of navigation for large boats, was 25,873, of which 7,680 were steamboats.

There were 1,217 passenger boats and 18,886 steam tugs passed the boundary at Emmerich, carrying 792,437 tons cargo. The passenger boats also carry freight. The 79,918 boats of all kinds passing the border carried 23,188,956 tons of freight.

Of the steamboats, 65 per cent were German, 27 per cent Hollandish, and 8 per cent Belgian. Of the sail and barges Germany had 50 per cent, Holland 34 per cent, Belgium 15 per cent, and other countries 10 per cent. In 1907 the number of boats had increased to 11,156. Of the 1,272 steamboats in 1907, 169 were of the wheel type, with 106,515 horsepower, and 1,103 were screw boats, with 175,278 horsepower.

(d) The ordinary day laborers receive about 10 cents per hour, and are subject to discharge at any time. Sailor laborers receive \$5.71 per week, and are subject to discharge at the end of the month. They provide for their food, clothes, etc. Men working at the cranes receive 35 marks (\$8.33) per week, and are subject to discharge at the end of the month.

RIVERS AND CANALS OF THE UPPER RHINE DISTRICT.

Report by WILLIAM I. PIKE, *American Consul at Kehl, Baden.*

The navigation of the upper Rhine is of great importance to the commerce of this consular district, inasmuch as the industries of Alsace-Lorraine and Baden, especially the coal and iron industries, must depend to a great extent upon the transportation facilities furnished by the upper Rhine.

The press and public have awakened to a realization of the importance of making the Rhine as navigable as possible, and it may be but a few years before even Switzerland will be connected by an inland waterway with the North Sea ports.

An inspection tour was recently arranged by the ministry of Strassburg for the purpose of noting the progress of the work involved in the deepening of the Rhine. Although the success of this undertaking is by no means assured, certain distances have been made navigable, so that the completion of the undertaking is considered probable by means of modern engineering methods. A short distance of about 10 kilometers (6.21 miles), near Drusenheim, has thus been regulated, and it was this stretch which the inspection committee was particularly interested in.

It has for some time been evident that the industries of this consular district depend to a great extent upon the success in making the upper Rhine navigable. The ministry of Strassburg, in 1893, considered this question and referred it to the neighboring States of Baden and Bavaria. These States preferred a canal from Ludwigshafen, near Mannheim, to Strassburg, which has also been agitated by the local chamber of commerce, but the immense cost of such a canal makes it almost impracticable.

In the year 1901 an agreement was made among the States of Baden, Bavaria, and Alsace-Lorraine, the same being approved by their respective legislative bodies, according to which the cost of deepening the Rhine between Strassburg and Mannheim was to be divided as follows, the entire cost being estimated at 13,500,000 marks (\$3,213,000): Bavaria to pay 800,000 marks (\$190,400), Baden 40 per cent, and Alsace-Lorraine 50 per cent; the city of Strassburg 1,000,000 marks (\$238,000), and the "Rheinische Kohlenkentor" (Rhine Coal Company) 700,000 marks (\$166,600).

The stream must be so regulated that it will have a depth of at least 2 meters (6.56 feet) and must have a width of at least 88 meters (288.71 feet). If this undertaking, which was begun last year, should be successful, the Rhine will be made navigable between Strassburg and Mannheim for a period of 353 days of the year, instead of about 128 days, as is the case at the present time.

One great obstacle in the success of this engineering feat is the amount of quicksand and sand bars which are washed into the channel of the river.

It is estimated that the completion of this work would require no less than fourteen years, and the final cost of the same will amount to considerable more than the original claim of 13,500,000 marks (\$3,213,000).

The freight boats at present can not go farther south than Strassburg, and special efforts are now being made to deepen the channel between Strassburg and Basel, thus giving water facilities to Colmar and Mülhausen, two important manufacturing centers of upper Alsace which are already reached by the Rhine-Rhone canal system.

The distance between Strassburg and Basel is 125 kilometers (77.63 miles), which stretch was navigable only from the last of April to the second week in July during 1907.

It is a noteworthy fact that the Rhine has a much larger stream of water during the summer months than in the winter time. The past summer the railroad bridge at Kehl on account of the high-water mark could not be passed by boats with a height of more than $11\frac{1}{2}$ feet above water surface.

According to the Strassburg Chamber of Commerce the average time for a freighter down the river, according to tests made during the year, was about six hours, while the time consumed in going up to Basel was about twenty-four hours, and further, that there were ten such trips made in each direction.

During the coming spring improvements in wharf facilities will also take place. The landing place at Basel is to be enlarged and the one at Strassburg is now undergoing repairs, while the coal and iron industries of Metz will demand a better wharf at that point.

To the immediate section affected the importance of the deepening of the Rhine can not be overestimated, as it assures splendid water transportation facilities for this great industrial southern Germany.

During the past year two most important developments have occurred in the improvement and navigation proposition of the upper Rhine.

The first is the now demonstrated success of the engineering feat to overcome the quicksand and sand bars that constantly change the channel of the river and make extensive shipping impossible. The second is the confirmed statement that Switzerland, Alsace-Lorraine, and Baden will take up the project of making the Rhine navigable for the 77 miles between Strassburg and Basel by the same methods now used in deepening the Rhine between Mannheim and Strassburg.

At the time of the consummation of this project of deepening and making the upper Rhine navigable it was agreed that the maintenance of improvement should be provided for by the adjoining States.

For the improvements thus far made between the cities of Mannheim and Strassburg, a distance of 131 kilometers (81.40 miles), the latest available figures show that the States of Alsace-Lorraine and Baden each expend in maintenance of the Rhine improvements about 600,000 marks (\$142,800) annually.

The State of Alsace-Lorraine, which is included in this consular district, has 413 kilometers (256.63 miles) of canals which are main-

tained by the State at an annual cost of about 350,000 marks (\$83,300). An additional average expenditure is also made each year for the improvements, amounting in round numbers to 173,000 marks (\$41,174).

While this consular district, which includes the territory of Alsace-Lorraine and the Grand Duchy of Baden, enjoys the advantage of transportation facilities by railway, river and canal, the character of the goods shipped by each makes a comparative statement of rates of small value.

The only subject of interest as to rates and water transportation on the river Rhine is from the city of Mannheim to Strassburg, a distance of 143 kilometers (88.86 miles), this being the only river route of any importance in this district.

The traffic on the river Rhine between the above-mentioned cities consists chiefly of coal, wood, flour and cereals, amounting last year to nearly 1,000,000 tons.

The freight rates for the foregoing articles, which constitute 90 per cent of the shipments in bulk, are from 1.70 marks (40 cents) to 2 marks (48 cents) per ton, and for piece or case goods from 2.50 marks (60 cents) to 4 marks (95 cents) per ton. It is well to add that the season for river traffic is only from April until August, that time being the period of high water.

Considering next the canal system, which ranks next to the river in importance as a carrier, the rates of transportation for coal, wood, flour and cereals, which also constitute the great bulk of goods transported, are as follows in bulk:

Strassburg-Colmar, 66 kilometers (41 miles), 1.60 marks to 1.80 marks (38 cents to 43 cents) per ton.

Strassburg-Mulhausen, 107 kilometers (66.49 miles), 1.80 marks to 2.20 marks (43 cents to 52 cents) per ton.

Strassburg-Metz, 155 kilometers (96.31 miles), 2.40 marks to 2.60 marks (57 cents to 62 cents) per ton.

Strassburg-Saarbruecken, 116 kilometers (65.87 miles), 2 marks (48 cents) per ton.

Piece goods are only shipped on the canal Strassburg-Colmar-Mülhausen:

From Strassburg to Colmar, 3.50 marks (83 cents) per ton—41 miles.

From Strassburg to Mülhausen, 5 marks (\$1.19) per ton—66.49 miles.

The treatment of railway rates in any other than a general way is impossible, as the German system is perhaps the most complicated tariff in Europe, and the same can only be understood with the aid of the tariff volume, a special tabulation of 562 pages.

The railway freight tariff is first divided into four general classes:

I. Piece goods.

(a) Slow freight.
(b) Express.

II. General carload lots.

III. Carload lots (special tariff).

IV. Carload lots (exceptional tariff).

A further special classification is given goods under these general divisions—i. e., goods light in weight requiring much space; goods

inflammable or explosive, requiring special care; and shipments of goods that must have attention by employees en route to their destination, etc.

As previously stated, there is a general and special tabulation and classification under the four chief divisions, but for general information as it is, the freight rates are per 1 ton for 100 miles in Alsace-Lorraine:

Piece goods: Fast freight, 37.20 marks (\$8.85); slow freight, 18.60 marks (\$4.43).

General carload lots: 5-ton lots, 64 marks (\$15.23); 10-ton lots, 109 marks (\$25.94).

Special tariff carload lots: Raw material, 10-ton lots, 42 marks (\$10); fertilizer, 10-ton lots, 38 marks (\$9.04); road material, 10-ton lots, 30 marks (\$7.14); cereals, 10-ton lots, 66 marks (\$15.71).

For the purpose of comparison, to cover the only class of goods that are carried by the three mentioned competing systems, the following are the freight rates by railway from Mannheim to Strassburg, distance 143 kilometers (88.86 miles):

	Per ton.	
	Marks.	Dollars.
Wood.....	4.30	1.02
Coal.....	3.80	.90
Cereals.....	7.10	1.69

It can be said that on the Rhine at this point there are no tolls or other charges for the use of waterways, and it is pertinent to observe that the law proposing tolls met with such strong opposition from industrial circles, commercial bodies, and chambers of commerce, that the scheme has, for the present at least, been abandoned.

The amount of water-borne traffic is steadily increasing on the part of the Rhine that is navigable, and the same is also true of traffic on the canals.

The freight on the upper river consists chiefly of coal, cereals, and oil, which for the year 1908, combined, amounted to 744,760 tons, and for the same class of freight and same year the tonnage on the canals in the district amounts to 354,399 tons.

The prevailing channel depth of the river Rhine varies according to the season of the year from 1 meter (3.28 feet) to 3.50 meters (11.48 feet), the highest water being during the summer months. The most important canals have a depth of 2 meters (6.56 feet) and a width at the bottom of usually 10 meters (32.81 feet) and at the surface 14 to 16 meters (45.93 to 52.49 feet).

As to the type of river boats coming to Strassburg the length varies from 70 to 98 meters (229.66 to 321.52 feet), the keel depth 1.75 to 2.40 meters (5.74 to 7.87 feet), and the width amounts to 9 meters (29.53 feet). The boats on the canals are, on account of the size of the locks, prescribed as follows: No boat should be longer than 38.50 meters (126.31 feet) on the principal canals, and the width is allowed to be 5.10 meters (16.73 feet) and the depth of boats to be not more than 1.80 meters (5.90 feet). The height of boats should not be more than 3.50 meters (11.48 feet).

The method for the propulsion of freight river boats is by accompanying steamer, side wheelers, with a capacity of moving three or four freight boats. There are also a few screw steamers in use. The boats on the canals are only moved by horses, as no steam power is allowed on the same.

For the loading and unloading of freight at terminals, good provision is always made—electric cranes are usually installed by the city and large companies and are of the most modern and improved type.

ADDENDA.

WATERWAY IMPROVEMENTS.

Regarding the method used to overcome quicksand and sand bars in the river Rhine, it may be observed that the methods are identical with those now in use in the United States. The fascines consist of heavy stones, and large bundles of brushwood which are bound together with wire and are sunk into the water and built out from each shore in the form of piers to the proposed channel and to a special height.

These fascines are constructed at a distance of from 200 to 300 meters apart, and it has been demonstrated that the currents carry and deposit the quicksands into these sections, leaving the channel free.

FLOATING EQUIPMENT.

(1) See page 160, last paragraph. Self-propelled vessels are not usually loaded with freight so far as the upper Rhine is concerned. They are used only to tow barges.

(4) The modern boats are usually constructed of iron.

(5) To use the commercial expression, the cost of steamboats (side wheelers) is usually from 250 to 300 marks per horsepower, and these steamers generally have from 750 to 850 horsepower. Screw steamers, which only come to Strassburg during an exceptionally high stage of water, cost about 200 to 260 marks per horsepower, and barges cost about 50 to 55 marks per each ton loading capacity.

(6) On the river Rhine at this point there is only one type of boats. On the canals, boats are built of wood, as described above, and are generally all of the same type.

(8) There are no special type of boats for low-water stage. When the stage of the river is low the boats are loaded accordingly.

OWNERSHIP OF VESSELS AND BUSINESS ORGANIZATION.

(a) Most of the canal boats are owned by private persons and the family lives on the boat. Large factories have their own canal boats, which are operated only for their own use. Example: The sugar factory of Franckenthal has its own boats running on the canals.

(b) On the river Rhine there are two large steamship companies of this character: The Vereinigung von Spediteure und Schiffer, con-

sisting of small shipping firms working together, and the Co-operative Shipper Vereinigung at Rotterdam. Besides these, 31 share companies take part in the shipping traffic of the river Rhine.

(c) Vessels are not operated by railroads. The coal firms of Westphalia have their own boats, as well as the Standard Oil Company, whose ships come as far up the Rhine as Strassburg.

(d) No.

(e) No.

TERMINAL FACILITIES.

(a) No special features.

(b) Electric cranes with self-catcher are mostly in use.

(c) Yes. The harbor of Strassburg has direct connections with the main railway lines and tracks are located on wharves to permit direct transfer of goods between the cars and the ships.

(d) The terminals are owned by the city.

TOLLS AND FREIGHT RATES.

(a) No tolls are charged on the river Rhine. (See above, p. 159, par 3.) There exists, however, a toll on the canals of Alsace-Lorraine amounting to 0.18 pfennig per ton per kilometer, but there are no charges whatever for passing through locks, etc. In exceptional cases ships are allowed to pass at night and in this case extra charges are made to pay the lock men.

(b) There exists no special tariff for towing boats on the river Rhine; the charges differ very much and are governed according to the demand. Towing charges are low when many ships are not in use—the average charge for towing loaded barges on the river Rhine between Mannheim and Strassburg, a distance of 131 kilometers, is 90 pfennigs per ton. For towing empty boats down the river from Strassburg to Mannheim, about 100 marks are charged.

(c) Yes; but the governing element is the demand for boats and the average tariff on the canals in Alsace-Lorraine is 1.40 marks per ton and kilometer.

(d) 1. The longer the distance the smaller the rate for 1 ton-kilometer.

2. Same as above.

3. The rates are affected by speed and increased rates are charged where special delivery is required.

4. See page 159.

(e and f) No.

(g) The general attitude of rail and water lines is friendly and severe competition does not seem to exist.

(h) Matter of government ownership covers this question.

WATER-BORNE TRAFFIC.

(a) See page 159.

(b) Not obtainable.

(c) Local traffic largely predominates.

RAILWAY RATES, INLAND WATERWAYS, AND CANALS OF BAVARIA.

Report by THOMAS WILLING PETERS, *consul-general at Munich.*

Bavaria's geographical position as a manufacturing and commercial country is particularly unfavorable. The central and southern parts of the country, which are chiefly agricultural, with no considerable supplies of coal and iron of their own, are connected by the Danube with the agricultural countries on the middle and lower course of the latter, but for a long distance have only railway connections with the coal and iron districts of western and central Germany. The result is that in the main part of the country, with the exception of the yarn and textile manufactures of Augsburg, no large industries have been able to exist. It is one of the most important problems of Bavaria how these unfavorable commercial and industrial conditions may be improved. By a special treaty with Prussia, Bavaria has secured the navigability of the Main, a tributary of the Rhine, as far as the Bavarian town of Aschaffenburg. The plan is discussed to make the Main navigable as far as the city of Bamberg and thence to construct a canal navigable for large boats southward to the Danube.

This would make Bavaria the most important transit country of Europe, as it would secure a direct navigable route between the North Sea and the Black Sea, between the large industrial and mining centers of western Germany and the agricultural sections on the middle and lower Danube. The idea is promoted by many persons of great influence in Bavaria, but it is questionable whether it will be possible to obtain a sufficient water supply for carrying out the plan. The costs of transportation at present increase the price of coal in southern Bavaria by more than 50 per cent. The costs for the railway transportation of flour from Rotterdam to Munich in quantities of 10 carloads amount to 3.88 marks per 100 kilos. If sent by towing boat to Mannheim and thence by rail to Munich the costs are diminished to 2.45 marks per 100 kilos. They would be considerably smaller still if there existed a navigable waterway between the Rhine and the Danube. In case of consignments smaller than half a carload (5,000 kilos) the difference is nearly 3 marks.

Nearly all the Bavarian railways are owned and operated by the State. The freight rates on the various lines in general are the same, with the exception that on small side lines, with no large traffic of their own, the ordinary rates are increased by 20 per cent. This is a financial measure, as these lines, which have been built in the interest of small villages, as a rule yield no returns on the capital invested in them by the State.

Since the beginning of the present year the different German States have an agreement, according to which the cars and locomotives of

each single State are allowed to run on the tracks and be used by the railways of all the other States.

We may distinguish the following classes of railway freight rates:

1. Rates which are the same in all German States, and which are determined by a permanent freight rate commission, composed of representatives of the various German States who have railways of their own.

2. Special rates common to two or more German States, and made by special agreement between the respective governments.

3. Rates made by the Bavarian Government without a consultation of other German governments generally in the interest of commerce or industries.

The rates of the first class are as follows:

Rates for 100 kilograms for consignments of less than 5,000 kilograms (one-half carload).

Distance.	a. Fast freight.	b. Ordinary freight.	c. Special rates of ordinary freight for certain articles.		
			Marks.	Marks.	Marks.
100 kilometers.....			2.48	1.24	0.99
200 kilometers.....			4.50	2.25	1.80
515 kilometers ¹			9.48	4.74	4.32

¹ The maximum distance in Bavaria.

Carload freight.

Distance.	General rates.				Special rates.		
	I.	II.	I.	II.	III.	IV.	
	Marks.	Marks.	Marks.	Marks.	Marks.	Marks.	Marks.
100 kilometers.....	0.86	0.72	0.59	0.54	0.44	0.34	
200 kilometers.....	1.54	1.32	1.12	1.02	0.82	0.56	
515 kilometers.....	3.65	3.20	2.70	2.44	1.92	1.25	

The rates of class *a* and *b* (fast freight and slow freight) are less for longer distances, the rates for class *b* (ordinary freight) being as follows:

	Pfennigs.	Dollars.
From 1 to 50 kilometers.....	11	0.026
From 51 to 200 kilometers.....	10	0.024
From 201 to 300 kilometers.....	9	0.021
From 301 to 400 kilometers.....	8	0.019
From 401 to 500 kilometers.....	7	0.017
Over 500 kilometers.....	6	0.014

The rates of class *a* (fast freight) are double the rates of class *b* (ordinary freight).

All the other classes of rates are determined absolutely according to distance, as follows:

For class *c* (special rates for small consignments) 8 pfennigs per 10 kilometers.

For carload freight:

General rates.		Special rates.			
I.	II.	I.	II.	III.	IV.
Pfennigs. 6.7	Pfennigs. 6	Pfennigs. 5	Pfennigs. 4	Pfennigs. 3	Pfennigs. 2.2

Fast freight has the speed of an ordinary passenger train. If fast freight is sent by an express train the rates are doubled. In case of an entire carload of fast freight a reduction of about 30 per cent is granted. Carload freight may also be sent as fast freight, in which case the ordinary carload rates are doubled.

Fast freight is always sent in covered cars. There are special reductions of the fast-freight rates in favor of certain agricultural products, such as fruit and milk. In some cases this reduction equals 50 per cent.

The different rates in the general and special tariff for carload freights are based on the general consideration that certain articles of small value can not be sent for great distances and sold if the costs of transportation are not materially lowered. These special rates therefore have the purpose of securing the marketability and selling power of certain articles at distant places. This will become clear by mentioning some of the articles in each of three special-rate classes: Class I—hides, cereals, raw wool, zinc in plates; Class II—clay, paper and pasteboard if exported, hemp, jute, vegetables, asphalt; Class III—furniture of persons moving from one place to another, cement goods, tar, straw, stone, rags, brans, ores, sand, fertilizers, barrels.

Some articles have been put into the reduced special-rate lists to encourage industries or agriculture.

The same considerations which have led to the establishment of the special-rate classes for goods sent in quantities of not less than 5,000 kilos have also given rise to a special reduced commodity rate (rate *b*) for consignments of less than 5,000 kilos.

In consignments of less than 5,000 kilos the terminal charges, including loading and unloading, but exclusive of the delivery, are included in the rates. In the case of consignments of more than 5,000 kilos the terminal charges are not included in the rates and the terminal service is generally attended to, not by the railway, but by the addressee himself or by forwarding agents.

There is a special fee for small services, such as issuing bills of lading, etc. This fee per carload (10,000 kilograms) is as follows: Fast freight, 2 marks; slow freight, Class I, 2 marks; Class II, 1.2 marks (reduced rate); special rates 1.2 marks for all four classes.

Storage is charged at the rate of 0.04 pfennig per 100 kilos in open spaces and 10 pfennigs in covered places.

If the loading and unloading is attended to by employees of the railroad the work is charged for at the rate of 0.04 pfennig for 100 kilos.

INDEPENDENT TARIFFS (SPECIALLY BAVARIAN).

We may distinguish two kinds of independent Bavarian tariffs: (a) The so-called exceptional tariffs made for reasons of internal

commerce; (b) the independent tariffs influencing the commercial relations to other German and foreign states.

(a) *Exceptional rates.*—The exceptional tariffs are all commodity or accommodating rates, varying according to the various articles included. In all there are more than twenty different rates in this class, among which may be mentioned the rates for raw materials, sugarbeets, fertilizers, ores, and sands. Some of them have the object of favoring industries or of insuring the sale of certain products which would otherwise be valueless. The exceptional rates become lower for greater distances.

The following may be given as examples of the exceptional rates:

	Wood.	Raw materials.	Wood building material.
	Pfennigs.	Pfennigs.	Pfennigs.
100 kilometers.	0.39	0.29	0.24
200 kilometers.	.72	.51	.34
515 kilometers.	1.25	1.67	.78

QUESTION I. COAL RATES.

Coal belongs to Class II of the exceptional tariffs. The rates apply only if coal is sent from railway stations where the mines are located. Coal sent from other stations is charged according to Class III of the special tariffs. The object of making cheaper rates for direct shipments from the mines is to do away with intermediate trade, which increases the market prices of the commodity.

Subjoined are rates for coal not sent from mining stations (Class III of the special tariffs) on ten different lines for various distances (tariff common to the various German States).

To—	Augsburg.		Freilassing.		Hof.	
	Kilo-meters.	Marks for 10,000 kilos.	Kilo-meters.	Marks for 10,000 kilos.	Kilo-meters.	Marks for 10,000 kilos.
Amberg.....	205	57	252	67	155	46
Aschaffenburg.....	303	79	475	117	287	75
Fuerth.....	251	67	292	76	204	57
Lindau.....	193	64	363	92	496	121
Schweinfurt.....	257	69	402	100	185	53
Weissenburg.....	85	51	288	75	219	60
Wolnzach.....	88	32	202	56	274	72
Worringen.....	93	33	263	70	392	98
Zorneding.....	85	31	119	38	341	87
Zwiesel.....	251	67	283	74	303	79

To—	Nuremberg.		Rosenheim.		Munich.	
	Kilo-meters.	Marks for 10,000 kilos.	Kilo-meters.	Marks for 10,000 kilos.	Kilo-meters.	Marks for 10,000 kilos.
Amberg.....	68	27	248	67	207	58
Aschaffenburg.....	192	54	427	106	366	93
Fuerth.....	161	47	289	76	248	67
Lindau.....	330	85	281	74	221	61
Schweinfurt.....	120	38	378	95	318	82
Weissenburg.....	53	23	206	57	145	44
Wolnzach.....	139	43	121	39	60	25
Worringen.....	226	62	181	52	127	39
Zorneding.....	222	61	38	16	27	13
Zwiesel.....	220	60	201	56	196	55

The following is a table of rates on coal from mining stations on 10 different lines for various distances (independent Bavarian rates, rate on raw materials). The same reductions are granted to coal sent from the mining stations of other German States into Bavaria (by special agreement) :

To —	Eichhofen.		Hausham.		Peissenberg.	
	Kilo-meters.	Marks for 10,000 kilos.	Kilo-meters.	Marks for 10,000 kilos.	Kilo-meters.	Marks for 10,000 kilos.
Augsburg.....	154	41	116	33	91	27
Bamberg.....	151	40	315	76	291	71
Bayreuth.....	158	42	337	87	321	78
Erlangen.....	115	52	276	68	252	62
Ingolstadt.....	87	26	135	37	136	37
Kempten.....	226	57	94	28	157	42
Regensburg.....	13	13	192	49	193	49
Schwandorf.....	36	19	235	58	235	59

To —	Schwandorf.		Schwarzenfeld.		Stockheim.	
	Kilo-meters.	Marks for 10,000 kilos.	Kilo-meters.	Marks for 10,000 kilos.	Kilo-meters.	Marks for 10,000 kilos.
Augsburg.....	184	34	192	49	264	65
Bamberg.....	157	42	156	41	64	21
Bayreuth.....	103	30	95	28	79	24
Erlangen.....	118	33	117	{ 33 24 }	103	30
Ingolstadt.....	117	33	125	35	244	61
Kempten.....	256	63	264	65	419	94
Nuremberg.....	24	28	94	28	127	35
Regensburg.....	43	16	51	18	224	56
Schwandorf.....	196	50	196	50	181	47
Würzburg.....					164	43

(b) *Independent rates (made for reasons of commerce with other German and foreign States).*—The following examples will give an idea how these are calculated: Coal to a distance of 350 kilometers, 2.2 pfennigs per kilometer and per 100 kilos; the distance in excess of 350 kilometers, a reduction to 1.4 pfennigs per 100 kilos per kilometer; that is to say, in a distance of 500 kilometers 350 kilometers are charged at the rate of 2.2 pfennigs, 150 kilometers at the rate of 1.4 pfennigs.

QUESTION II. IRON ORE, STONE, LUMBER, FERTILIZER, GRAIN.

Stone, from 1 to 100 kilometers, 2.7 pfennigs per 100 kilos and per kilometer; the distance from 100 to 200 kilometers, 1.7 pfennigs; from 200 to 300 kilometers, 1.6 pfennigs, as explained above. Road-building material, from 1 to 80 kilometers, 2 pfennigs; from 80 to 200 kilometers, 1.4 pfennigs. Fertilizers, up to 350 kilometers, 2.2 pfennigs; for the distance exceeding 300 kilometers, 1.4 pfennigs. Ores, from 1 to 217 kilometers, 2.312 pfennigs; for the distance exceeding 217 kilometers, 2.2 pfennigs. Iron, 2.8 pfennigs per 100 kilos per kilometer. Cereals, up to 102 kilometers, 4.5 pfennigs; for the distance from 102 to 400 kilometers, 1.43 pfennigs. Cereals from Bavarian stations to the German seaports, 4.5 pfennigs up to 102 kilometers; for the distance from 102 kilometers to 400, 1.43 pfennigs.

In the direction of Switzerland (to promote exportation), to the Rhine ports, to Württemberg, the rate from Bavarian stations is 2.6 pfennigs. To compete with Austrian grain going from Austria to Switzerland through Bavaria (transit commerce), 3.2 pfennigs are charged for grain coming from Austro-Bavarian border stations.

The rate on toys, an important article of Bavarian manufacture, from certain Bavarian stations to the Rhine ports and to the German, Belgian, and Dutch seaports, is 4 pfennigs (normal rate, 6 pfennigs). On iron and steel the normal rate is 4.5 pfennigs; export rate, 2.8 pfennigs.

The general object of these independent tariffs is to promote exports, to render the importation of certain raw materials for home industries cheaper, to obstruct foreign competition, to secure a cheaper transportation of fertilizers, and to attract transit commerce.

Subjoined are a few more examples:

In the case of fertilizers there is no discrimination between different lines, as these articles are chiefly imported.

Iron ore, normal rate, 2.7; reduced independent rate, 2.2 pfennigs; smelting work in Prussia and Saxony noncompetitive points and vice versa up to 100 kilometers, 1.9 pfennigs; from 100 to 190 kilometers, 1.5 pfennigs; for the distance exceeding 190 kilometers, 1 pfennig; between Bavarian and Saxo-Prussian competitive points, 2 pfennigs up to 50 kilometers; for the distance exceeding 50 kilometers, 1.8 pfennigs.

Stone, normal rate, 2.7 pfennigs; reduced independent rate, 2.2 pfennigs per 100 kilometers; to Bavarian stations and ports of other German States from 1 to 100 kilometers, 2.7 pfennigs; 100 to 200 kilometers, 1.7 pfennigs; 200 to 300 kilometers, 1.6 pfennigs; distances exceeding 300 kilometers, 2 pfennigs; to Austrian and Austro-Bavarian stations, 2.2 pfennigs (to promote exportation).

To these rates must be added the fee charged for switching the cars, for loading, and issuing the bills of lading. This fee in the case of independent rates is as follows per 10,000 kilos (carload): Coal (for exportation), 3.50 marks; stone, 6 marks (for exportation in certain cases, from 6 marks to nothing); fertilizers, 7 marks (for the distance in excess of 350 kilometers, 3.50 marks, to encourage direct importation from the seaports); iron ore, 3.50 marks, to stations of other German States, 6 marks; cereals, 4.50 marks. The normal fees in these cases are as follows: Coal, stone, fertilizers, 6 to 12 marks; iron ore and cereals, 6 marks.

We therefore have the following classes of freight rates in Bavaria:

1. Freight rates in common with other German States.

Decreasing according to distance. } a. For consignments of less than 5,000 kilograms fast freight, ordinary freight, special rate for certain commodities.
b. For consignments of more than 5,000 kilograms, two classes of general rates and four classes of special rates.

Determined absolutely according to distance. } b. For consignments of more than 5,000 kilograms, two classes of general rates and four classes of special rates.

2. Independent rates.

Decreasing regularly according to distance. } a. Exceptional rates for internal commerce.

Decreasing or increasing regularly or irregularly according to distance. } b. Independent rates for commerce with other German or with foreign states.

As to commodity rates, we may distinguish a commodity rate for fast freight (milk, fruit, etc.), for ordinary freight in consignments of less than 5,000 kilos and in carload assignments (Classes II, III, and IV of the special rates). The independent rates all are commodity rates.

CHAP. II.

RIVERS AND CANALS.

There are only two rivers navigable for larger boats in the principal part of Bavaria. The Danube from Passau to Regensburg, and the Main, a tributary of the Rhine, from Aschaffenburg to Kizingen. To these must be added the Rhine, which forms the eastern border of the Polahvat.

Public supervision on the Danube is exercised by the state offices for roads and rivers in the various places. The same applies to the Main and the Rhine. For the latter there exists, moreover, an international commission composed of representatives of the various Rhine States, viz: Prussia, Holland, Hessia, Baden, Bavaria, and Alsace-Lorraine.

The state offices for roads and rivers mentioned above are subordinated to the governments of the various circles or political subdivisions of Bavaria, which in turn have to report to the minister of the interior.

The canals of Bavaria are not important. There is a canal connecting the Main with the Danube for very small boats, but the traffic is entirely inconsiderable. The canal department belongs to the ministry of railways and commerce.

The navigable rivers and canals, as far as they are public, must be kept in proper state for navigation by the state government.

The statistics of river and canal navigation are collected and published by the Bavarian office of statistics in Munich.

So far there is no established policy as to water power developed by works constructed for improving navigation. But certain rules will probably be established in the near future.

Bavaria has spent considerable sums for river improvements, the total amounts being as follows:

	Marks.
Rhine-----	15,400,000
Main-----	17,700.000
Danube-----	22,800,000
	<hr/>
	55,900,000

The ports and landing arrangements are the property of the State. Terminal works have been constructed on the Danube at Passau, Deggendorf, and Regensburg; on the Rhine at Ludwigshafen, Speyer, and Maximiliansau; on the Main at Aschaffenburg. There are no important cases of terminal facilities provided by private persons or companies.

The tracks of the railroads, which are all state railways, are always located so as to permit a direct transfer between railroad and water lines. The Bavarian ports on the Danube and Main contain no docks and wharves.

The costs of the terminal arrangements of the Danube ports are as follows:

	Marks.
Regensburg -----	2,400,000
Passau -----	800,000
Deggendorf -----	140,000

In the Danube the rocky channel of the river has been improved for purposes of navigation for a length of about 30 kilometers and adapted to low-water stage of 1 meter and 40 centimeters. The costs amounted to about 1,500,000 marks. The minimum water stage at which navigation is practicable for the ordinary boats is 1.3 meters.

Only paddle steamers are used. The steamers do not carry freight, but are used only for towing.

On the Danube there are three large private steamship companies—an Austrian company, a Hungarian company, and a specifically Bavarian, or, rather, South German company. The Bavarian state railways favor the latter by special reduced rates to the steamers of the Bavarian company in the Danube ports at Regensburg and Passau for assignments to the lower Danube countries—Roumania, Serbia, and Bulgaria. The following table shows the difference between the ordinary rates from Munich to Regensburg and the reduced rates in favor of the South German steamship companies:

	To Regensburg for further transportation to the lower Danube with the steamers of the above company.	To Regensburg without such further trans- portation.	
		Marks.	Marks.
Beer, cotton goods, preserves, soap, per 1,000 kilos:			
In consigments of less than 5,000 kilos.....	.74	1.69	
5 tons.....	.61	1.15	
10 tons.....	.56	.98	
Malt, per 100 kilos:			
Consignments of less than 5,000 kilos.....	.74	1.69	
5 tons.....	.61	.84	
10 tons.....	.56	.77	
Paper:			
Consignments of less than 5,000 kilos.....	.74	1.69	
5 tons.....	.56	.84	
10 tons.....	.51	.77	

Railroad freight rates to water competitive points are not higher than to interior nonwater points.

There is consequently no active competition between railway lines and navigation lines. This will be clear from what has just been stated in regard to the measures taken to favor the South German Steamship Company. The following is a table of river rates in the Danube between Regensburg and Passau and on the state railway line parallel to the river:

	River rate.	Railway rate.
Cotton and cotton goods.....	0.18	0.83
Lumber.....	.20	.53
Cereals.....	.25	.65

In case the goods are to be sent on at Passau to the Balkan countries with vessels of the South German Steamship Company, the above railway rates are reduced to 0.37, 0.28 and 0.41 marks, respectively.

If a very low water stage of the Danube obstructs navigation, the articles sent by ships from the lower Danube to the border port at Passau are sent on to their places of destination at reduced rates by the state railway.

The waterways in general have a greater competitive power than railways, especially in case of large consignments. But in Bavaria their competitive power is very limited in view of the unfavorable geographical condition mentioned at the beginning.

There are no tolls charged on Bavarian rivers and canals.

The quantity of commodities hauled on Bavarian rivers is not considerable, as there is no large industrial and commercial population in the vicinity of these rivers. The statistics for the three Danube ports for the last ten years are as follows (in tons) :

	1899.	1900.	1901.	1902.	1903.	1904.	1905.	1906.	1907.	1908.
Passau:										
From Austria...	69,695	72,720	97,352	87,960	77,554	52,792	74,336	87,009	16,790	68,756
To Austria.....	8,655	5,226	3,568	6,304	11,042	12,276	8,517	9,127	18,489	16,211
Regensburg:										
From Austria...	101,346	127,702	134,094	107,713	139,089	111,793	157,829	160,908	163,743	98,616
To Austria.....	24,741	21,443	25,699	32,246	38,120	36,475	42,193	52,330	64,846	78,806
Deggendorf:										
From Austria...	1,714	1,137	1,404	2,480	1,061	2,157	11,144	.....	.....	1,138
To Austria.....	725	1,664	2,144	3,684	3,319	2,316	2,769	.....	.....	.....

The statistics for the water traffic of Würzburg, one of the Main ports, are the following (in tons) :

	Imports.	Exports.
1902.....	2,942	5,436
1903.....	6,709	9,476
1904.....	7,751	11,061
1905.....	14,694	12,005
1906.....	16,400	17,636
1907.....	10,676	18,397
1908.....	12,871	22,575

The traffic of Bavarian Rhine ports above Ludwigshafen is much more considerable, averaging in imports and exports about 2,000,000 tons per annum.

The chief commodities transported on the Danube are cereals, wood and petroleum; on the Main, cereals, flour, wood and sugar.

Bavaria has no canal or other waterway improvement companies.

The chain-towing steamers on the Main, the steamship traffic on Lake Constance and a few other small lakes and rivers, and the vessels on the small canal mentioned before are owned and operated by the Bavarian state railway.

The towing rates in the Main are charged separately for vessels and cargo. The rates for vessels are as follows:

Vessels with a tonnage up to—	Pfennigs per kilometer.	Vessels with a tonnage up to—	Pfennigs per kilometer.
500 kilos.....	3	60 tons.....	44
3 tons.....	7.7	75 tons.....	48
5 tons.....	12.8	100 tons.....	56
10 tons.....	16.3	125 tons.....	62
20 tons.....	21.4	150 tons.....	68
30 tons.....	27.2	175 tons.....	74
40 tons.....	32.4	200 tons.....	80
50 tons.....	38		

And further for each additional 100 tons, 16 pfennigs per kilometer.

Up to a distance of 18 kilometers there are additional charges to these rates, as follows:

	Per cent of the ordinary rate.		Per cent of the ordinary rate.
Up to 4 kilometers.....	50	Up to 12 kilometers.....	20
Up to 5 kilometers.....	45	Up to 13 kilometers.....	17.5
Up to 6 kilometers.....	40	Up to 14 kilometers.....	15
Up to 7 kilometers.....	36	Up to 15 kilometers.....	12.5
Up to 8 kilometers.....	32	Up to 16 kilometers.....	10
Up to 9 kilometers.....	28.5	Up to 17 kilometers.....	7.5
Up to 10 kilometers.....	25	Up to 18 kilometers.....	5
Up to 11 kilometers.....	22.5		

Towing rates for cargo on the Main. The unit is 1 pfennig per ton per kilometer. Up to a distance of 32 kilos the following additional charges are made:

	Per cent of the ordinary rate.		Per cent of the ordinary rate.
Up to 4 kilometers.....	40	Up to 19 kilometers.....	19.5
Up to 5 kilometers.....	39	Up to 20 kilometers.....	18
Up to 6 kilometers.....	38	Up to 21 kilometers.....	16.5
Up to 7 kilometers.....	37	Up to 22 kilometers.....	15
Up to 8 kilometers.....	36	Up to 23 kilometers.....	13.5
Up to 9 kilometers.....	34.5	Up to 24 kilometers.....	12
Up to 10 kilometers.....	33	Up to 25 kilometers.....	10
Up to 11 kilometers.....	31.5	Up to 26 kilometers.....	9.7
Up to 12 kilometers.....	30.5	Up to 27 kilometers.....	7.5
Up to 13 kilometers.....	28.5	Up to 28 kilometers.....	6
Up to 14 kilometers.....	27	Up to 29 kilometers.....	4.5
Up to 15 kilometers.....	25.5	Up to 30 kilometers.....	3
Up to 16 kilometers.....	24	Up to 31 kilometers.....	2
Up to 17 kilometers.....	22.5	Up to 32 kilometers.....	1
Up to 18 kilometers.....	21		

The South German Steamship Company on the Danube has one general rate and two commodity class rates. Besides these there is a combined general and commodity class rate to certain Austro-Hungarian ports, a special commodity class rate to Austro-Hungarian ports, and a separate commodity class rate to ports on the lower

Danube (Servia, Bulgaria, Roumania). Finally, there is a special combined rate of the steamship company mentioned and the Roumanian state railways, for direct transportation between Bavarian Danube ports and Roumanian river railway stations.

For loading commodities from the railway cars into its boats the company charges 7 pfennigs per 100 kilograms for objects of transportation weighing not more than 100 kilograms. The charges for single freight of a higher weight is subject to special agreement.

All consignments are insured by the company itself up to a value of 120 marks for each 100 kilograms. If shippers send cargoes of a higher value and wish them to be insured for their entire value, the company charges additional insurance fees for the same in excess of the value of 120 marks per 100 kilograms.

Freight rates of the South German Steamship Company from Regensburg.

Per 100 kilograms to—	General rate.	Commodity rate (A).		Commodity rate (B).
		Marks.	Marks.	
Vienna.....	1.66	1.23	1.06	
Budapest.....	2.59	1.96	1.66	
Belgrade.....	3.71	2.48	1.96	

Per 100 kilos to—	Combined general commodity rate. Special rate to certain Austrian ports.	Special commodity rate.	Commodity rate to lower Danube ports.	
			Marks.	Marks.
Vienna.....	0.77	0.64	.....
Budapest.....	1.36	1.11	.....
Belgrade.....	.....	2.12	.....	2.12

The reasons for establishing two special commodity rates coincides with those that led to the introduction of the special commodity rates of the state railways. The commodity rates to Austria and the lower Danube countries are export rates, which may be supposed to have been established under the influence and with the cooperation of the Bavarian Government.

The average wages of workmen in the service of the Bavarian Danube ports are about as follows: Mechanics (in the workshop), 5 marks; apprentices, 1 mark; day laborers, 4.25 marks per day.

BAVARIAN WATERWAYS AND CANALS.

Report by GEORGE NICOLAS IFFT, *Consul at Nuremberg.*

IMPROVEMENTS AND TRAFFIC.

River and canal navigation in the Kingdom of Bavaria presents few points of interest unless it be considered from the standpoint of representing types of what such navigation ought not to be. The Ludwigs Canal, which, by the way of the Main, connects the Danube and the Rhine and, theoretically, is the link completing an all-water highway from the Black Sea to the Atlantic Ocean, over which should pass the outgoing corn from the fields of Hungary, and the incoming raw material and merchandise for both Austria and Hungary, fails entirely in this purpose. It is antiquated in type and inadequate in extent. The traffic it carries is trifling and almost entirely local in character. The river traffic is of larger volume and more notable, but even that is inconsiderable. In no sense is there any competition between rail and water routes. The government owns the railroads and the canal; also the chain towing systems operated on the rivers and by its harbor, landing, warehouse and other fees practically controls all other river navigation. This fact entirely eliminates any question of real competition, and rates for both are regulated in accordance with the financial plans of the state ministry of transportation, or of the interior, as the case may be. As highways of traffic in Bavaria, the following water routes are to be considered:

1. The Ludwigs Canal, extending from Bamberg on the Main to Kelheim, near Regensburg on the Danube, a distance of 107 miles.
2. The Main, a chain towing system from Aschaffenburg to Würzburg and Kitzingen, a distance of 124 miles. This chain towing system is in course of extension from Kitzingen to Bamberg, a further distance of 71 miles.
3. The Danube, from Regensburg to Passau, a distance of 94 miles.
4. Lake Constance, and, for some purely local traffic, a few of the larger interior lakes of Bavaria, such as the Ammersee, the Starnbergersee, etc.

The Main and the Danube are open waterways. The Ludwigs Canal is the property of the Kingdom of Bavaria. Lake Constance is an international body of water, the traffic on which is operated jointly by the Bavarian and Swiss railway departments. As freight rates on the lake boats are fixed so that they will be just the same as those of the railroads for transportation around the lake, they are scarcely worth further consideration.

In Bavaria all river improvements for the furtherance of navigation are made by the government. Docks, wharves, freight ware-

houses, etc., are also all built by the government, but communities especially benefited are required to contribute a proportion of the cost commensurate with the special benefit derived. This is sometimes in money, sometimes a free site, or otherwise. The discretion of the ministry in such matters is broad. Tolls are charged on neither the natural waterways nor the canal, but there are fees for traversing the canal, for river towing, harbor fees, crane fees, warehouse fees, etc., and from these the government derives its revenues and makes effective its control. The theory of the Bavarian waterway laws is that the sum total of such fees must not exceed an amount sufficient to pay for maintenance, reasonable returns upon the investment in such improvements, and provide for the ultimate repayment of the original cost.

The control of canals is vested in the ministry of transportation, which also has control of the railroads, the telegraph, the telephone, the post-office, etc. All are parts of the same system for the forwarding of passengers, freight, express, mail, telegrams, and long-distance talking. Improvements of open rivers are under the jurisdiction of the ministry of the interior. There are no other navigation corporations in Bavaria proper, and therefore no capitalization of such, either controlled or uncontrolled. Some Austrian companies operate on the short stretch of the Danube between Regensburg and Passau, but, of course, subject to the Bavarian laws. Government regulation of freight traffic on both canal and rivers is exercised through the fixing of the fees for traversing the canal, the fees for the chain towing on the Main, as well as the harbor, warehouse, terminal, and other fees on both the canal and the Main and the Danube. The Government provides for maintenance and operation, and makes all improvements in channels, builds docks, cranes, terminals, etc. The Government publishes annually full and detailed reports of operations and improvements and statistics of traffic, which are included with the statistics of railway operations and in the various publications of the Bavarian statistical bureau and in the annual imperial statistics of inland water traffic.

There is no established policy as to water-power development or as to the improvement of navigation. There is, however, in existence an organization known as the Royal Bavarian Waterways Commission, the object of which is to keep before both Government and people the matter of river and canal improvements, study the needs and possibilities of such improvements, the possibilities of water traffic, and work out plans for the extension of the same. It is a semiofficial body and is doing most excellent work.

Attention is called to a publication entitled "A Memorial on the Improvement of Navigation on the Bavarian Danube and the Extension of Navigation from Regensburg to Ulm," by Eduard Faber.

This memorial presents an elaborate study of the Danube in Bavaria as a possible important highway of commerce, and is accompanied by a series of 28 statistical tables and eight elaborate drawings and maps. There are also two pamphlets by the same author, one entitled "On Inland Navigation Projects in Bavaria and their Economic Importance," and the other "On the Regulation of Erratic Flowing Streams at Low Water."

Attention is also called to a publication entitled "The Economic Value of Bavarian Water Highways," with a full and complete series of statistical tables, charts, etc., showing the relations of water routes and freight traffic, by Gustav Steller. The Report of the Ninth Annual Meeting of the Bavarian Waterways Commission, held June 5, 1909, is also important in this connection.

These publications illustrate the interest of the Bavarians in the creation of water highways and in securing the maximum benefits from waterways, which without the expenditure of large sums in improvements can scarcely be regarded as factors in the problem of transportation.

All canal work and river improvement is carried on by the Central Government, and, except as heretofore noted, at the expense of the Government. For example, for the Ludwigs Canal, from 1836 to 1859, the Government expended the total sum of \$6,587,510. From the latter date until 1863, the operation of the canal showed a net surplus, but since 1863 there has been a regular annual deficit, running sometimes as high as \$52,600. For the year 1908 the deficit was \$23,700. These deficits are paid by the state and are regularly provided for in each budget. The maintenance of the canal (repairs), not counting the cost of management, called for an expenditure of \$13,367.

For the chain-towing plant and improvements of the river Main the Government, up to the close of the year 1908, paid out a total of \$1,462,000. Under enactment of June, 1894, an appropriation of \$1,611,260 was made for this improvement. From the years 1898 to 1902 the Main traffic was operated at a loss to the Government, but since that time there have been annual net earnings varying from \$3,000 to \$12,000.

On the Ludwigs Canal the boats are towed by line, and to a small extent also on the Main. On the Main, however, most of the boats are towed by the chain-towing plant as far as Kitzingen. By exceptionally favorable water conditions, steam towboats can come as far as Würzburg. Downstream the boats, as a rule, float with the stream.

The canal boats are 98 feet long, 14.8 feet wide, and 3.6 feet deep. On the Main the maximum dimensions of the boats are:

	Length.	Breadth.	Depth.
	Feet.	Feet.	Feet.
Freight steamboats.....	125	21.3	5.4
Freight towboats.....	213	26	7.2
Sailboats.....	269	33	7.9

On the canal the boats are all of wood. Most of the Main boats are also of wood. The Bavarian Government has, however, four iron canal boats on the Main, and recently several cement factories have placed iron boats on the river. These boats vary so greatly in type that even an approximate figure as to their cost is impracticable. The largest of them is a very small vessel. The iron coal boats of the Government cost \$2,356 each. There was paid for the five tow chains, in 1898, \$34,224; in 1899, \$39,270; and in 1900, \$41,222. Such

things as fleets of barges can not be said to exist. The type of boats on the canal and most of those on the Main, especially the iron coal boats, are constructed with a view to utilization at low water.

The towboats belong to individual shippers. Neither canal companies nor waterway-improvement companies own vessels, nor do such companies exist. There are no cases of consolidation of vessel owners for operating extensive fleets on these waters, nor are there any such fleets, aside from the few boats owned and operated by the cement manufacturers on the Main. The public authorities own or operate no merchant vessels, and there are no combinations or monopolies controlling towing on either canal or river.

The harbor facilities and appliances for loading and unloading are everywhere of the simplest nature, in many instances almost primitive. The main canal harbor is at Nuremberg, and there are harbors at Bamberg, Schweinfurt, Kitzingen, Ochsenfurt, Würzburg, and Aschaffenburg, and wood-loading stages at Staffelbach, Schweinfurt, Marktbreit, Ochsenfurt, Kitzingen, and Würzburg. At Kitzingen and Würzburg, especially, there are sidetracks permitting direct transfers of freight from river to railway and vice versa, but such connections exist to a greater or less extent at most other harbor points. All harbor and terminal facilities are the property of the State and are operated by the State.

NAVIGATION FEES AND FREIGHT RATES ON THE BAVARIAN CANALS AND RIVERS.

Navigation fees proper—that is, charges for the traversing the waters—are, as heretofore noted, collected only on the Ludwigs Canal. These fees amount to 1 pfennig (about one-fourth of a cent) per kilometer (0.62 mile) for each metric ton (2,204 pounds) of freight moved. Empty boats pay no fees.

As already noted, the Ludwigs Canal has been operated at a loss for a number of years past, and under the present condition of the canal this situation is likely to continue indefinitely.

Towing charges on the Main for the government chain towing plant operated on that river were at first based upon the actual cost for the service, but in the course of time it was found necessary to readjust them for several reasons, but especially on account of the competition of towing with horses, which is slower and less certain but cheaper. Later various politico-economical reasons, such as a desire to assist smaller shipmasters in their efforts to do business on the river, were also taken into account in fixing the rates to be charged for towing.

“Regulations and Tariffs of the Government Chain Towing Navigation on the Main,” in force since January 1, 1905, gives in the fullest detail examples of all possible combinations affecting towing fees and the regulations in regard to the same.

There are three navigation companies operating on the Danube that figure to some extent in Bavarian freight traffic, and that have regular freight rates and classifications. These are: (1) Erste K. K. Priv. Donau-Dampschiffahrts-Gesellschaft; (2) K. Ungarische Fluss- & Seeschiffahrts-Actiengesellschaft; (3) Süddeutsche Donau-Dampfschiffahrts-Gesellschaft.

As I am preparing this report I note that the Austrian Government is taking steps to take over the latter corporation and operate it as a government property.

Freight rates on the three steamship lines above referred to for the principal commodity brought by them into Bavaria—that is, for grain—are fairly stable, but rates on practically all other commodities, especially those exported from Bavaria, are extremely variable and almost every shipment might fairly be said to be subject to individual rating and classification.

Freight rates on the Danube, as well as on other waterways, are affected by the following factors: Distance of haul; quantity of goods—that is, whether single package, large quantity, or entire boatload, or whether single shipments or a series of shipments covering a fixed period of time; speed—that is, whether shipped by express or ordinary freight boats; nature of commodities shipped, whether dangerous or inconvenient to handle, interfering with other traffic, difficult to load and unload; character of packing—heavy or light, space occupied in relation to weight, etc.

These classifications are, however, so involved and goods are so frequently affected by two, three, or four or more of such factors and in such varied manner that the services of an expert are required to figure out the rate on almost every individual shipment. The numerous possible combinations of qualities and conditions affecting rates make it almost impossible to state any general rule under which freight rates might be calculated. For instance, according to the tariff of the Erste K. K. Priv. Donau-Dampfschiffahrts-Gesellschaft, the following characteristics of commodities are taken into account in determining the rate to be charged for shipments of goods by their express boats:

Kind of goods.	If forwarded by express boats the regular freight rates are raised—
	Per cent.
All goods, except those mentioned below and very heavy goods.....	100
Blockading goods—that is, those likely to interfere with traffic.....	200
Ships and boats, because of the difficulties in loading and transporting.....	300

On the Main freight rates are fixed practically for each separate shipment and under conditions existing at the time of shipment. The traffic is practically in the hands of forwarding agents, but the total is trifling.

Prorating arrangements between water lines and railroads—that is, joint rail and water tariffs—do not exist with regard to navigation on the Ludwigs Canal, the Main, or that part of the Danube which is within Bavaria—that is, the water route from Regensburg to Passau. The traffic selects one or the other route independently of the other or, if it uses both routes, they are treated independently.

With regard to shipments of grain up the Danube into Bavaria, a joint water and rail rate is in existence. The grain comes as far as Vienna or Passau by water and thence by rail. This, however, means an all-rail route in Bavaria.

As stated in the introduction to this report, the water routes of Bavaria are not competitive, and neither river nor canal traffic affects the freight rates of the railroads. A comparison of water rates with paralleling railway rates is therefore of little interest. The waterways are too short to give any effective illustration and, besides, comparisons are difficult because of the difference in classifications for rail and water freights. I give, however, the following two examples for what they are worth:

PASSAU TO REGENSBURG.

[1 kilometer (0.62 miles). 100 kilos (220 pounds).]

<i>Railroad, 118 kilometers.</i>	<i>Waterway, 153 kilometers.</i>
Regular highest tariff, 34 cents per 100 kilos.	Regular highest tariff, 24 cents per 100 kilos.
Regular lowest tariff, 9 cents per 100 kilos.	Regular lowest tariff, 12 cents per 100 kilos.

FRANKFORT-ON-THE-MAIN TO WÜRZBURG.

<i>Railroad, 132 kilometers.</i>	<i>Waterway, 218 kilometers; average freight rates; down the river.</i>
Exceptional tariff, 11½ cents per 100 kilos.	Wooden boards, 6 to 7 cents per 100 kilos.
Exceptional tariff, 13½ cents per 100 kilos.	Grain, 7 to 7½ cents per 100 kilos.
Regular tariff, 21½ cents per 100 kilos.	Collective freight, 11 to 13 cents per 100 kilos.
Regular tariff, 17 cents per 100 kilos.	
Exceptional tariff, 19 cents per 100 kilos.	
.	<i>Up the river.</i>
	Grain, 8 to 9½ cents per 100 kilos.
	Oils and fats, 11 to 13 cents per 100 kilos.

The Bavarian water highways are a part and parcel of the government transportation systems. They complement each other and may, in certain instances, make possible lower rates on certain routes. It could not, however, be said that railroad rates would be higher if no water transportation existed. The Government is always in a position to see that its transportation lines are not injured by private undertakings. In a general way it may be said that the water routes are a distinct advantage to the railroads. The Main, for example, offers excellent facilities for the floating of logs and lumber to points where it can be handled by the railroads and, except for the Main, much Bavarian timber would never reach the Bavarian state railways.

The Danube is also hardly a competitor of the railways, so far as local Bavarian traffic is concerned, and with regard to the long-distance traffic, especially to Austria-Hungary and the countries along the lower Danube, it undoubtedly brings to the railroads more traffic than it takes from them.

Direct legislation in regard to the relations between rail and inland water highways does not exist and has, I believe, never been considered by the Bavarian legislature.

The Statistical Yearbook for the Kingdom of Bavaria, 1909, gives the total number of vessels in service as follows:

	Steamers.	Other boats.	Total capacity.
On the Danube.....	12	107	Tons. 60,737
On the Main.....	2	226	29,408
On the Ludwigs Canal.....		15	1,720
On Lake Constance.....	7	6	1,525
On Bavarian lakes.....	15	2	420

The total water traffic on the Danube and Main in Bavaria for the same year, in metric tons, was as follows:

	Received.	Shipped.	Passed.
Regensburg.....	118,990	79,645	.....
Passau.....	64,763	23,909	.....
Aschaffenburg.....			293,915
Würzburg.....			45,396

In addition to the above there were 323,000 tons of timber, etc., in rafts floated past Aschaffenburg on the Main.

The principal items were grain, wood, petroleum, and other oils, stone, ores, and clay.

The total freight moved on the Ludwigs Canal was 66,739 metric tons.

Very full and detailed statistics of water-borne traffic on the Bavarian water highways will be found in the volume "The Economic Value of Bavarian Water Highways," by Gustav Steller, secretary of the Royal Bavarian Waterways Commission. Other publications on these subjects, I will refer to generally only:

1. Statistics of the German Empire, the volume on Inland Navigation, issued by the imperial bureau of statistics.
2. The Statistical Yearbook of the Kingdom of Bavaria. See pages 171-174.
3. The Annual Report of the Chamber of Commerce at Regensburg, pages 19-20 and 136-141.
4. The Annual Report of the Chamber of Commerce at Passau, pages 35-40 and 82.
5. The Annual Report of the Chamber of Commerce at Würzburg, pages 118-128.
6. The Annual Report of the Royal Bavarian Railways Administration, pages 28-31, 205-212 and 225-228.

I desire to call especial attention to the fact that, in this report, I have dealt only with Bavaria on the Right of the Rhine and have not at all referred to the Pfalz, a segregated fragment of the Kingdom situated on the left banks of the Rhine, and remote from my district.

The Süddeutsche Donau-Dampfsciffahrts-Gesellschaft publishes rate sheets giving joint water and rail rates with the various transfer points along the Danube, from which any point I may have overlooked may be worked out.

This report has been prepared in compliance with circular instructions dated August 16, 1909, (File No. 17594).

Walter D

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